

**KAPLAN**

# GED\*

**COMPLETE SELF-STUDY GUIDE FOR THE GED TESTS**

**2007–2008 EDITION**

**POWERFUL, PRACTICAL TOOLS TO HELP YOU PASS THE TEST**

- ▶ **FULL-LENGTH PRACTICE TEST**
- ▶ **DETAILED ANSWER EXPLANATIONS**
- ▶ **DIAGNOSTIC FEEDBACK**
- ▶ **POWERFUL SCORE-RAISING STRATEGIES**
- ▶ **HUNDREDS OF PRACTICE QUESTIONS**
- ▶ **COMPREHENSIVE REVIEW FOR EVERY SECTION OF THE TEST**

***Higher Score Guaranteed\****

**Caren Van Slyke & Associates**

\*GED is a registered trademark of the American Council on Education, which neither sponsors nor endorses this product.

† Or your money back. Conditions apply. See inside for details.



## HIGHER SCORE GUARANTEE

Kaplan has helped more than three million students to prepare for standardized tests. We invest more than \$4.5 million annually in research and support for our products. We know that our test-taking techniques and strategies work, and we know that our materials are completely up-to-date. However, if after using the book your scores don't improve, or if you are not satisfied with this book for any reason, you may return it and get your original purchase price back, exclusive of sales tax, shipping, and handling. In order to receive a refund, you must return this book, along with your original sales receipt with the purchase price and date of purchase circled, and a brief (50 words or less) explanation of why you did not find the book helpful.

**Send to:**           **Simon & Schuster Inc.**  
                          **Customer Service Department**  
                          **100 Front Street**  
                          **Riverside, NJ 08075**

All claims for refunds must be received by Simon & Schuster within 90 days of the date of this book's purchase. Excludes book postage, handling, and sales tax. One offer per person and address. Refunds will be issued in six to eight weeks. U.S. residents only. Void where prohibited. Visit [kaplanpublishing.com](http://kaplanpublishing.com) for guarantee updates.

# GED

**2007-2008 EDITION**

Caren Van Slyke and Associates

**KAPLAN**

**PUBLISHING**

New York • Chicago

The GED tests are developed and distributed by the GED Testing Service, a program of the American Council on Education, which neither sponsors nor endorses this product.

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional service. If legal advice or other expert assistance is required, the services of a competent professional should be sought.

Editorial Director: Jennifer Farthing  
Editors: Megan Gilbert and Eric Titner  
Production Editor: Samantha Raue  
Production Artist: John Christensen  
Cover Designer: Carly Schnur

© 2003 Learning Unlimited

Published by Kaplan Publishing, a division of Kaplan, Inc.  
888 Seventh Ave.  
New York, NY 10106

All rights reserved. The text of this publication, or any part thereof, may not be reproduced in any manner whatsoever without written permission from the publisher.

Printed in the United States of America

January 2007  
07 08 10 9 8 7 6 5 4 3 2 1

Kaplan Publishing books are available at special quantity discounts to use for sales promotions, employee premiums, or educational purposes. Please call our Special Sales Department to order or for more information at 800-621-9621, ext. 4444, e-mail [kaplanpubsales@kaplan.com](mailto:kaplanpubsales@kaplan.com), or write to Kaplan Publishing, 30 South Wacker Drive, Suite 2500, Chicago, IL 60606-7481.



---

# WELCOME TO *KAPLAN GED!*

Congratulations. You've selected a powerful and effective self-study guide for the GED produced by Kaplan, the world's leader in test preparation. Each year, Kaplan provides the courses, books, software, and online tools to help hundreds of thousands of people succeed on standardized tests, including the GED.

To provide you with the best possible book for passing the GED, Kaplan has partnered with Caren Van Slyke and Learning Unlimited. Van Slyke and the rest of the Learning Unlimited staff have decades of experience teaching GED classes and preparing GED study materials.

This book has been designed to help you prepare for the tests in the way that best suits your needs and your schedule. Below is a plan to get the most benefit out of *Kaplan GED*.

- Step 1:** Read the *Overview of the GED Tests*, pages vii–viii, to get an overview of the five test areas.
- Step 2:** Look over the *Contents*, pages iv–vi, for a general idea of the topics that are covered in this book. You may be surprised at how much of the subject matter you recognize.
- Step 3:** Read *Kaplan GED Strategies for Success*, pages ix–xvi. You may come back to these proven test-taking strategies several times, especially in the week before you take the test.
- Step 4:** Take the *GED Pretests* on pages 2–43. These half-length practice tests have been designed to acquaint you with the GED and to help you analyze how to prepare best.
- Step 5:** Read the answers and explanations that follow the *Pretests*. Use the *Evaluation Charts* in the Pretest Answers and Explanations section to make decisions about how to prioritize your study.
- Step 6:** Get a schedule of upcoming testing dates for taking the GED in your area. The schedules vary from location to location, so you will need to contact your local GED testing center for times and dates. To find a testing center convenient to you, contact the GED Hot Line at 1-800-62-MY-GED (1-800-626-9433), or contact a local community college or public school adult education program.
- Step 7:** Look at the results of your *Evaluation Charts* and the schedule of upcoming testing dates, to make a week-by-week study plan for yourself.
- Step 8:** Work through the book, studying the sections that are most important to you. Use the **Key Ideas**, **Hints**, and **On the GED** features in the margins of many of the pages to focus on the information and skills that you need to pass the tests. After you finish a practice activity, be sure to read the *Answers and Explanations* so that you can check your mastery of the material and learn from your mistakes.
- Step 9:** Plan to take the *GED Post-Tests* on pages 530–611 about two weeks before your scheduled testing dates.
- Step 10:** Use the results of the *Planning Charts* in the Post-Test Answers and Explanations section to plan your study for the last two weeks before you take the GED. Decide where you need to do the most work, and focus your efforts.

In the pages that follow, you will find all that you need to succeed on the GED. The next steps are up to you. Good luck!

---

# OVERVIEW OF THE GED TESTS

## Why Should I Take the GED Tests?

Since you are making the big commitment to study for the GED Tests, keep these goals in mind:

**Educational** You may find that you need to further your education. Many technical or vocational schools and training programs now require a high school diploma or the equivalent. Certainly, most two-year and four-year colleges have that requirement.

**Employment** Some employers now require a high school diploma or its equivalent to hire new workers. Also, even if you have a job, your employer may require a degree for advancement.

**Personal Satisfaction and Growth** Maybe you don't have educational or employment reasons for wanting the GED. You may want to prove to yourself, your family, or your friends that you can do it—that you can achieve a high school diploma or certificate, whether you have been out of school for four years or forty years. You should know you are in good company—many people take and pass the GED just so they can say, “I did it!”

## What's on the Tests?

Educational institutions and employers throughout the United States and Canada recognize the GED as a high school equivalency test. Every year, hundreds of thousands of individuals obtain GED diplomas or certificates as their first step toward further education or advancement in the workforce.

The GED is based on the major high school subject areas, as shown on the chart below. However, to pass the GED, you do not have to remember specific facts, dates, or terminology. Rather, you have to demonstrate that you can apply essential knowledge and skills to specific situations. This chart gives you basic information about the five test areas. Each section of this book begins with an “About the Test” overview with more detail and sample questions from each test area.

GED Test	Test Content	Question/Time Limit	Page Numbers
Language Arts, Writing	Sentence Structure • Organization • Usage • Mechanics  Essay Writing	Part I: 50 multiple-choice questions in 75 minutes  Part II: 1 essay in 45 minutes	61–160
Social Studies	U.S. History • World History • Geography • Economics • Civics and Government	50 multiple-choice questions in 70 minutes	161–228
Science	Life Science • Physical Science • Earth and Space Science	50 questions in 80 minutes	229–282
Language Arts, Reading	Fiction • Nonfiction • Drama • Poetry	40 questions in 65 minutes	283–340
Mathematics	Number Operations and Number Sense • Measurement and Geometry • Data Analysis, Statistics, and Probability • Algebra, Functions, and Patterns	Part I: 25 questions in 45 minutes with a calculator  Part II: 25 questions in 45 minutes without a calculator	341–529

## ALGEBRA

## Patterns and Functions

**Key Ideas**

- A pattern is a sequence of numbers determined by an algebraic rule.
- A function is an algebraic rule that shows how one set of numbers is related to another set of numbers.
- To use a function, substitute values for variables and solve.

**GED TIP**

*To figure out what rule has been used to form a pattern, begin by finding the difference between each term and the term that follows it in the sequence.*

**Recognizing Patterns and Functions**

A **pattern** is a series of numbers or objects whose sequence is determined by a particular rule. You can figure out what rule has been used by studying the terms you are given. Think: What operation or sequence of operations will always result in the next term in the series? Once you know the rule, you can continue the pattern.

**Example 1:** Find the seventh term in the sequence: 1, 2, 4, 8, 16, . . .

1. Determine the rule. Each number in the sequence is two times the number before it.
2. Apply the rule. You have been given five terms and must find the seventh. Continue the pattern. The sixth term is  $16 \times 2 = 32$ , and the seventh term is  $32 \times 2 = 64$ .

A **function** is an algebraic rule that shows how the terms in one sequence of numbers are related to the terms in another sequence. For example, a sidewalk vendor charges \$1.50 for a slice of pizza. The chart below shows how much it would cost to buy one to six slices.

Number of Pizza Slices	1	2	3	4	5	6
Cost	\$1.50	\$3.00	\$4.50	\$6.00	\$7.50	\$9.00

Each number in the first row corresponds to a price in the second row. We could say that the amount a customer will pay is a function of (or depends upon) the number of slices the customer orders. This function could be written:

$$\text{Cost} = \text{number of slices} \times \$1.50, \text{ or } C = n(\$1.50).$$

If you know the function and a number in the first set of numbers, you can solve for its corresponding number in the second set.

**Example 2:** Using the function  $y = 3x + 5$ , what is the value of  $y$  when  $x = -3$ ?

1. Substitute the given value of  $x$ .  $y = 3(-3) + 5$
2. Solve for  $y$ .  $y = -9 + 5$   
 $y = -4$

**Example 3:** Using the function  $n = 100 - 4(3 + m)$ , what is the value of  $n$  when  $m = 6$ ?

1. Substitute the given value of  $m$ .  $n = 100 - 4(3 + 6)$
2. Solve for  $n$ .  $n = 100 - 4(9)$   
 $n = 100 - 36$   
 $n = 64$

## ALGEBRA ► PRACTICE 9

### A. Solve.

- Which number should come next in the following pattern?  
-12, -9, -6, -3, \_\_\_\_\_
- What is the next number in the sequence?  
21, 26, 31, 36, \_\_\_\_\_
- In the function  $y = 4x + 10$ , if  $x = -2$ , what is the value of  $y$ ?
- In the function  $y = 2x(4 + x) - 2$ , if  $x = 3$ , what is the value of  $y$ ?
- Each term in the second row is determined by the function  $y = 2x - 1$ .

$x$	1	2	3	4	5	...	12
$y$	1	3	5	7	9	...	

What number belongs in the shaded box?

- In the function  $y = \frac{x+3}{6} - 8$ , if  $x = 21$ , what is the value of  $y$ ?
- What is the next term in the pattern below?  
1000, 500, 250, 125, 62.5, \_\_\_\_\_
- What is the next number in the sequence?  
3, -5, 7, -9, 11, \_\_\_\_\_
- Each term in the second row is determined by the function  $y = 3x + 5$ .

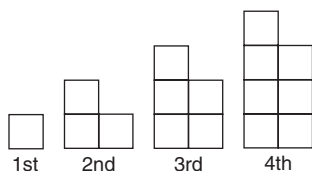
$x$	-2	-1	0	1	2	...	9
$y$	-1	2	5	8	11	...	

What number belongs in the shaded box?

- In the function  $y = (x - 7) + 12$ , if  $x = -10$ , what is the value of  $y$ ?

### B. Choose the one best answer to each question.

Question 11 refers to the following drawing.



- How many blocks would be needed to build the 25th construction in the sequence?
  - 47
  - 49
  - 51
  - 55
  - Not enough information is given.

- What is the 6th term in the sequence below?

$$-14, -8, -2, 4, \dots$$

- 8
- 10
- 14
- 16
- 22

- The price per scarf is a function of the number of scarves purchased. The table shows the price per scarf for purchases of up to four scarves.

number ( $n$ ) of scarves	1	2	3	4
cost ( $c$ ) per scarf	\$5.00	\$4.75	\$4.50	\$4.25

Which of the following functions was used to determine the prices shown in the table?

- $c = n(\$5.00 - \$0.25)$
  - $c = \$5.00 - \$0.25(n - 1)$
  - $c = \$5.00 - \$0.25n$
  - $c = \$5.00n - \$0.25$
  - $c = \$5.00n - \$0.25n$
- Which of the following sequences could be created using the function  $y = 4x - 3$ ?
    - 1, 4, 7, 10, 13, ...
    - 1, 5, 9, 13, 17, ...
    - 1, 4, 8, 13, 19, ...
    - 1, -1, -3, -5, -7, ...
    - 1, -2, -5, -8, -11, ...

**Answers and explanations begin on page 678.**

## ALGEBRA

## Function Applications

**Key Ideas**

- Functions are used to make many common work calculations.
- Functions can be used to make comparisons.
- To use a function, you must know the meaning of the variables. This information should be given in the text of the problem.

**GED TIP**

*There is often more than one way to work a problem, even when a function is given. Solve using the function. If you see another way to solve the problem, use it to check your answer.*

**Solving Function Word Problems**

Functions are used in many business applications. For instance, they can be used to calculate profit, cost, employee wages, and taxes. On the GED Math Test, you will read about common work and life situations. The problems may contain or describe a function that you can use to solve the problem.

**Example 1:** Anderson Advertising is finishing a series of print ads for a client. Finishing the project will cost \$2,000 per day for the first seven days, and \$3,500 per day after seven days. The finishing costs can be found using the function  $C = \$2,000d + \$1,500(d - 7)$ , where  $C$  = the cost of finishing the project and  $d$  = the number of days. If the project takes 12 days to complete, what will the project cost?

$$\begin{aligned} \text{Use the function to solve the problem.} \quad C &= \$2,000d + \$1,500(d - 7) \\ &= \$2,000(12) + \$1,500(12 - 7) \\ &= \$24,000 + \$1,500(5) \\ &= \$24,000 + \$7,500 \\ &= \mathbf{\$31,500} \end{aligned}$$

You may be asked to use functions to make comparisons.

**Example 2:** Nita decides to join a health club. She gets brochures from two health clubs and compares the plans. Anytime Fitness charges a one-time membership fee of \$250 and \$8 per month. Freedom Health Center charges \$25 per month. At both health clubs, the price ( $P$ ) Nita will pay is a function of the number of months ( $m$ ) she attends the club. The functions are:

$$\text{Anytime Fitness} \quad P = \$250 + \$8m$$

$$\text{Freedom Health Center} \quad P = \$25m$$

Nita plans to move in 18 months. If she attends a health club until she moves, which one offers the better price?

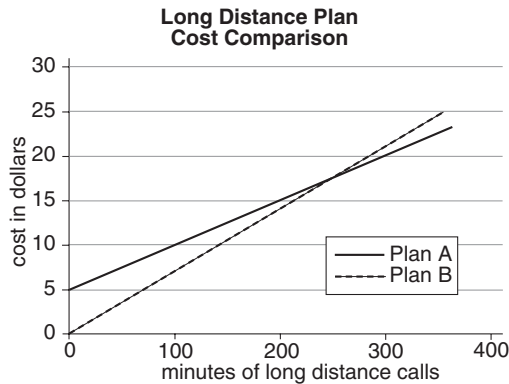
1. Find the price at Anytime Fitness:
 
$$\begin{aligned} P &= \$250 + \$8m \\ &= \$250 + \$8(18) \\ &= \$250 + \$144 \\ &= \$394 \end{aligned}$$
2. Find the price at Freedom Health Center:
 
$$\begin{aligned} P &= \$25m \\ &= \$25(18) \\ &= \$450 \end{aligned}$$
3. Compare the results. Even though Nita will have to pay a large amount up front, **Anytime Fitness** offers the better price.

## ALGEBRA ► PRACTICE 10

### A. Solve. You MAY use a calculator.

- The Chimney Sweep charges \$25 for a chimney inspection. If the customer purchases additional services, \$15 of the inspection fee is deducted. Let  $s$  = the cost of any additional services. The total cost ( $C$ ) of an inspection and services can be determined by the function  $C = \$25 + (s - \$15)$ .
  - Jan has her chimney inspected and purchases a smoke guard for \$89. How much will she be charged?
  - After an inspection, Ahmed decides to have a new damper installed for \$255. How much will he pay?
- Ricardo does a great deal of driving for his work. He generally estimates his driving time ( $t$ ) using the function  $t = \frac{m}{60}$ , where  $m$  = the number of miles.
  - How many hours will it take Ricardo to drive 330 miles?
  - How many hours will it take Ricardo to drive 255 miles?

- A customer's phone charges are a function of the number of minutes of long-distance calls made. The graph shows a comparison of two plans available.



- Michelle looks at her previous phone bills and finds that she makes about 350 minutes of long-distance calls per month. Which plan is better for her?
- Craig usually makes about 150 minutes of long-distance calls per month. Which plan is better for him?

### B. Choose the one best answer to each question. You MAY use a calculator.

Questions 4 and 5 refer to the following information.

Alicia is considering three job opportunities. At all three jobs, weekly pay ( $P$ ) is a function of the number of hours ( $h$ ) worked during the week. The functions are shown below:

$$\text{Job 1} \quad P = \$9.75h$$

$$\text{Job 2} \quad P = \$70 + \$8.40h$$

$$\text{Job 3} \quad P = \$380 \times \frac{h}{38}$$

- If Alicia works 30 hours in a week, how much more will she earn at Job 2 than at Job 1?
  - \$5.33
  - \$29.50
  - \$40.50
  - \$59.00
  - Not enough information is given.
- If Alicia works 40 hours per week, which of the following is a true statement?
  - Alicia will earn the most at Job 1.
  - Alicia will earn the least at Job 3.
  - Job 1 will pay more than Job 3.
  - Job 3 will pay more than Job 2.
  - Alicia will earn the most at Job 2.
- A company is awarded a \$95,000 job that will cost \$5,400 per day in expenses. Profits ( $P$ ) can be calculated using  $P = \$95,000 - \$5,400d$ , where  $d$  = days worked. How much profit is in a job that takes 14 days?
  - \$10,800
  - \$19,400
  - \$66,100
  - \$75,600
  - Not enough information is given.

Answers and explanations begin on page 678.

## ALGEBRA

## Inequalities

**Key Ideas**

- Use  $<$ ,  $>$ ,  $\leq$ , and  $\geq$  to show the relationship between two unequal expressions.
- The symbol always points to the smaller expression.
- Use inverse operations to solve inequalities. Reverse the inequality sign if you multiply or divide by a negative number.

**GED TIP**

Avoid the most common mistake with inequalities: reversing the symbol accidentally. Always check your work by substituting any number that fits the solution into the original inequality.

**Solving Inequalities**

An **inequality** is a mathematical statement that connects two unequal expressions. The inequality symbols and their meanings are:

$$\begin{array}{ll} > \text{ greater than} & \geq \text{ greater than or equal to} \\ < \text{ less than} & \leq \text{ less than or equal to} \end{array}$$

An inequality is solved much like an equation. Use inverse operations to isolate the variable.

**Example 1:** Solve for  $x$  in the inequality  $3x + 2 < 8$ .

1. Subtract 2 from both sides. 
$$3x + 2 < 8$$
$$3x < 6$$
2. Divide both sides by 3. 
$$x < 2$$

The solution  $x < 2$  states that any number less than 2 makes the inequality true. Check by substituting 1 (a number less than 2) for  $x$ :  $3(1) + 2 < 8$ , which simplifies to  $5 < 8$ , a true statement.

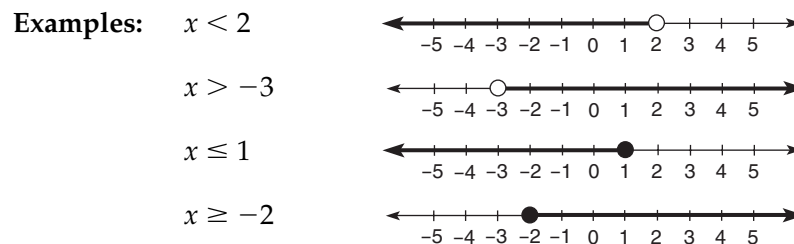
There is one important difference between solving equalities and inequalities. Whenever you multiply or divide both sides of an inequality by a negative number, you must reverse the inequality symbol.

**Example 2:** Solve for  $n$  in the inequality  $-2n - 5 \geq 3$ .

1. Add 5 to both sides to remove  $-5$  from the left side of the equation. 
$$-2n - 5 + 5 \geq 3 + 5$$
$$-2n \geq 8$$
2. Divide both sides by  $-2$  and *reverse the inequality symbol*. 
$$-2n / -2 \geq 8 / -2$$
$$n \leq -4$$

Check your work by substituting a number that is less than or equal to  $-4$  into the original inequality. Here  $-5$  is used for  $n$ . Since  $5 \geq 3$  is a true statement, the answer is correct.

When an inequality contains a variable, there are usually several numbers that make the inequality true. For that reason, we often graph the solution. In the examples below, a closed dot means that the number is included in the solution set. An open dot means the number is not included.





A **compound inequality** combines two inequalities. To solve a compound inequality, separate the inequalities and solve both. Then combine the solutions.

**Example 3:** Solve  $3x + 4 < 5x < 16 + x$ .

- |   |               |               |
|---|---------------|---------------|
| 1. Write two inequalities and solve each separately.      | $3x + 4 < 5x$ | $5x < 16 + x$ |
|   | $4 < 2x$      | $4x < 16$     |
| 2. Write the result as a compound inequality. $2 < x < 4$ | $2 < x$       | $x < 4$       |

In other words, any quantity that is greater than 2 *and* less than 4 will make the compound inequality true.

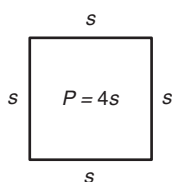
## ALGEBRA ► PRACTICE 11

### A. Solve.

- |                             |                                |                                   |
|-----------------------------|--------------------------------|-----------------------------------|
| 1. $3x - 7 > 5$             | 9. $\frac{x - 2}{3} > 2x + 11$ | 17. $6 \leq 3(x + 3)$             |
| 2. $13 < 2x - 1$            | 10. $6x < 5x + 2$              | 18. $\frac{4x}{3} > 8x - 20$      |
| 3. $4 + 2x \leq -2$         | 11. $x + 6 \leq 8x - 15$       | 19. $x - 2 < \frac{2x + 6}{4}$    |
| 4. $\frac{4 + x}{5} \leq 8$ | 12. $5x + 14 > 2 + 7x$         | 20. $x \geq 4x - 9$               |
| 5. $2(x + 3) < 4$           | 13. $13x - 7 \geq 25 - 3x$     | 21. $30 \geq 5(x + 4) \geq 10$    |
| 6. $3 + 9x \geq 4(x + 7)$   | 14. $x - 6 < 2(x + 2)$         | 22. $-7x > -2(x + 15) < 10$       |
| 7. $-4(x + 2) < 24$         | 15. $-5 + 3x \geq 4(3x - 8)$   | 23. $3 < 5x - 27 < 53$            |
| 8. $-2x + 9 < 1$            | 16. $36 > 4(x - 12)$           | 24. $22 \leq 6x - 2 \leq 4x + 16$ |

### B. Choose the one best answer to each question.

25. The perimeter of a square can be found using the formula  $P = 4s$ , where  $s$  is one side of the square.



The perimeter of a square is less than or equal to 64 inches. Which of the following represents the possible measures of the side of the square in inches?

- (1)  $s \leq 16$
- (2)  $s \geq 16$
- (3)  $s \leq 8$
- (4)  $s \geq 8$
- (5)  $s \leq 64$

26. Three added to the product of  $-4$  and a number ( $x$ ) is less than 5 added to the product of  $-3$  and the number. Which of the following is a graph of the solution set of  $x$ ?

- (1)
- (2)
- (3)
- (4)
- (5)

Answers and explanations begin on page 678.



## ALGEBRA

## Quadratic Equations

**Key Ideas**

- A quadratic equation can have two solutions.
- Set the quadratic equation equal to 0 and factor.
- Find the values for  $x$  that will make each factor equal 0.

**GED TIP**

*Trial and error can help you factor quadratic equations. You will get better at it, the more you practice.*

**Solving by Factoring**

A **quadratic equation** contains a squared variable, for example,  $x^2 - 3x = 4$ . One way to solve quadratic equations is by factoring. This is the simplest method and the one you should use on the GED Math Test. When you factor an expression, you find the terms that divide evenly into the expression.

**Example 1:** Factor the expression  $15x^2 + 9x$ .

1. Look for a term that divides evenly into both  $15x^2$  and  $9x$ . Both terms can be divided by  $3x$ .
 
$$15x^2 \div 3x = 5x$$

$$9x \div 3x = 3$$
2. Factor out  $3x$ . Write the terms as factors.
 
$$15x^2 + 9x = 3x(5x + 3)$$

Study Example 2 to learn how to multiply factors with more than one term.

**Example 2:** Multiply  $(2x + 3)(x - 4)$ .  
(factor) (factor)  
four terms

1. Multiply each term in the first factor by each term in the second factor.
 
$$2x \cdot x = 2x^2$$

$$2x \cdot -4 = -8x$$

$$3 \cdot x = 3x$$

$$3 \cdot -4 = -12$$

$$2x^2 + (-8x) + 3x + (-12) =$$
2. Combine the results.
 
$$2x^2 - 5x - 12$$

This method of multiplying factors is called the FOIL method. The letters in FOIL stand for First, Outer, Inner, and Last. Use the word FOIL to make sure you have performed all the necessary operations.

You factor a quadratic equation to solve it. A quadratic equation may have two solutions. Find values that make the factors equal to 0. Since a number multiplied by 0 is 0, each of the values is a solution.

**Example 3:** Solve  $x^2 - 3x = 4$ .

1. Set the equation equal to 0 by subtracting 4 from both sides.
 
$$x^2 - 3x = 4$$

$$x^2 - 3x - 4 = 0$$
2. Factor by trial and error. Think: What factors of the last term,  $-4$ , when added, will equal  $-3$ , the number part of the middle term?
 
$$(x \quad)(x \quad) = 0$$

$$(x + 1)(x - 4) = 0$$

$$-4 \cdot 1 = -4 \text{ and } -4 + 1 = -3$$
3. If either one of the factors equals 0, then the product of the factors will be zero. Set each factor equal to 0 and solve for  $x$ .
 
$$x + 1 = 0$$

$$x = -1$$

$$x - 4 = 0$$

$$x = 4$$

The solutions to the quadratic equation are **-1 and 4**.

## ALGEBRA ► PRACTICE 12

### A. Multiply.


- |                     |                       |                        |
|---------------------|-----------------------|------------------------|
| 1. $(x + 4)(x + 2)$ | 6. $(2x + 1)(x - 2)$  | 11. $(x - 6)(x + 5)$   |
| 2. $(x - 3)(x + 5)$ | 7. $(x - 9)(x - 5)$   | 12. $(x - 10)(x - 3)$  |
| 3. $(x - 1)(x + 4)$ | 8. $(x + 1)(3x - 2)$  | 13. $(2x + 1)(2x + 2)$ |
| 4. $(x - 6)(x - 3)$ | 9. $(x - 2)(x + 7)$   | 14. $(x + 9)(x - 4)$   |
| 5. $(x + 8)(x - 2)$ | 10. $(3x + 8)(x + 2)$ | 15. $(x - 5)(x - 5)$   |

### B. Factor each expression.

- |                     |                      |                      |
|---------------------|----------------------|----------------------|
| 16. $x^2 + 4x + 3$  | 21. $x^2 - x - 12$   | 26. $2x^2 + 5x - 3$  |
| 17. $x^2 + 4x - 5$  | 22. $x^2 + 2x - 35$  | 27. $2x^2 - 8x - 10$ |
| 18. $x^2 + 8x + 12$ | 23. $x^2 - 12x + 36$ | 28. $x^2 + 5x - 50$  |
| 19. $x^2 - x - 6$   | 24. $x^2 - 6x - 7$   | 29. $4x^2 + 4x - 3$  |
| 20. $x^2 + 5x - 14$ | 25. $x^2 + 4x - 32$  | 30. $x^2 + x - 56$   |

### C. Choose the one best answer to each question.

31. What are two solutions for the equation  $x^2 - x = 20$ ?
- (1) 4 and 5  
(2) -4 and 5  
(3) 4 and -5  
(4) -10 and 2  
(5) -2 and 10
32. For which of the following equations is  $x = -4$  a solution?
- (1)  $2x^2 - 8 = 0$   
(2)  $x^2 - 8x + 64 = 0$   
(3)  $x^2 - 2x - 15 = 0$   
(4)  $x^2 + 2x - 24 = 0$   
(5)  $2x^2 + 2x - 24 = 0$
33. What is the only positive solution for the equation  $2x^2 - 7x - 30 = 0$ ?
- (1) 4  
(2) 5  
(3) 6  
(4) 7  
(5) 8
34. The area of a rectangle is found by multiplying the length by the width. In the rectangle below, the area of the rectangle is equal to the expression  $2x^2 - 27x + 70$ .
- ?



$2x - 7$
- An expression equal to the length is shown on the diagram. Which of the following expressions is equal to the width of the rectangle?
- (1)  $x + 10$   
(2)  $x - 10$   
(3)  $2x + 10$   
(4)  $2x - 10$   
(5)  $2x - 5$

**Answers and explanations begin on page 678.**

## ALGEBRA

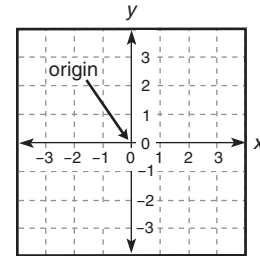
## The Coordinate Plane

**Key Ideas**

- A coordinate grid is formed by two intersecting axes, or number lines.
- The  $x$ -axis is horizontal and the  $y$ -axis is vertical.
- The location of a point is shown by two numbers called an ordered pair:  $(x,y)$ .

**Plotting Points**

A **coordinate grid** is a way to locate points that lie in a **plane**, or flat surface. The grid is formed by two intersecting lines, an  $x$ -axis and a  $y$ -axis. The  $x$ -axis is actually a horizontal number line, and the  $y$ -axis is a vertical number line. The point at which the two axes intersect is called the **origin**.

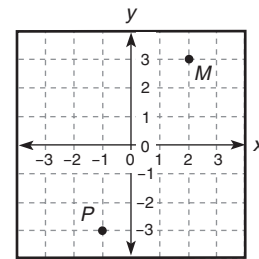


Each point on the grid can be named using two numbers called an **ordered pair**. The first number is the distance from the origin along the  $x$ -axis. The second number is the distance from the origin along the  $y$ -axis.

The numbers are written in parentheses and are separated by a comma:  $(x,y)$ .

**Example 1:** Write the ordered pairs for points  $M$  and  $P$ .

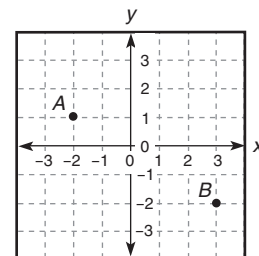
1. Point  $M$  lies 2 spaces to the right of the origin along the  $x$ -axis and 3 spaces above the origin along the  $y$ -axis. The coordinates are  $(2,3)$ .
2. Point  $P$  lies 1 space to the left along the  $x$ -axis and 3 spaces down along the  $y$ -axis. The coordinates are  $(-1,-3)$ .



To plot points on the grid, use the number lines located at the axes. Remember that right and up are the directions for positive numbers, and left and down are the directions for negative numbers.

**Example 2:** Point  $A$  is located at  $(-2,1)$ , and point  $B$  is located at  $(3,-2)$ . Plot these points on a coordinate grid.

1. To plot point  $A$ , start at the origin. Count 2 spaces left along the  $x$ -axis. Count 1 space up along the  $y$ -axis.
2. To plot point  $B$ , start at the origin. Count 3 spaces right along the  $x$ -axis. Count 2 spaces down along the  $y$ -axis.

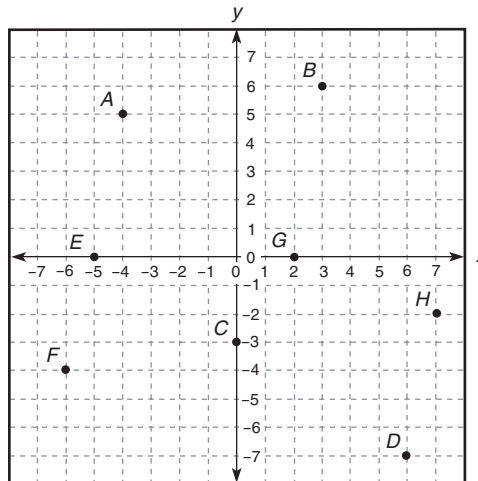
**GED TIP**

*If you are given a coordinate grid that is not labeled, remember that the origin is at  $(0,0)$ . Starting at the origin, count either right or left first and then up or down.*

# ALGEBRA ► PRACTICE 13

A. Write the ordered pair for each point.

1. Point *A*
2. Point *B*
3. Point *C*
4. Point *D*
5. Point *E*
6. Point *F*
7. Point *G*
8. Point *H*



B. Plot the points on the coordinate grid.

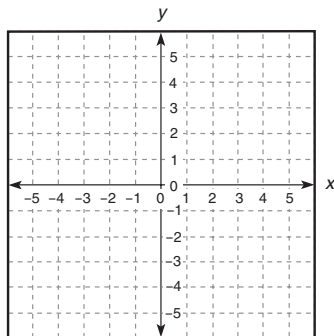
9. Plot the following points:

*J* at  $(-3, -2)$

*K* at  $(4, 0)$

*L* at  $(1, -3)$

*M* at  $(-4, 2)$



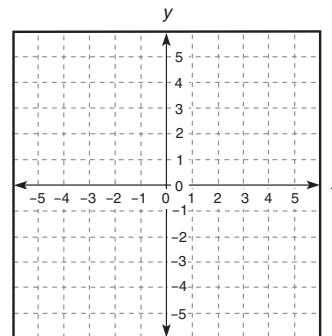
10. Plot the following points:

*N* at  $(0, -1)$

*O* at  $(-4, -4)$

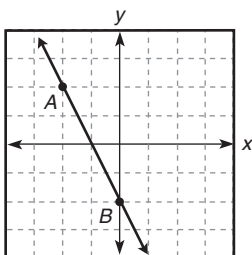
*P* at  $(3, 1)$

*Q* at  $(-3, 0)$



C. Choose the **one best answer** to each question.

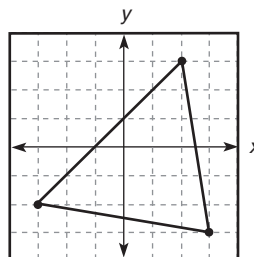
11. On the coordinate grid below, a line passes through points *A* and *B*.



Which of the following ordered pairs also lies on the line?

- (1)  $(1, 0)$
- (2)  $(1, -1)$
- (3)  $(0, 1)$
- (4)  $(0, -1)$
- (5)  $(-1, 0)$

12. Two of the corners of a triangle are located at  $(3, -3)$  and  $(2, 3)$ . What is the location of the third corner as shown in the diagram below?



- (1)  $(-3, -2)$
- (2)  $(-3, 2)$
- (3)  $(-2, -2)$
- (4)  $(-2, -3)$
- (5)  $(3, -2)$

Answers and explanations begin on page 679.

## ALGEBRA

## Linear Equations

**Key Ideas**

- A linear equation has two variables,  $x$  and  $y$ .
- When the solutions to a linear equation are graphed on a coordinate grid, the graph forms a line.
- To find a point on the line, substitute a value for  $x$  and solve for  $y$ .
- You must solve for at least two points in order to draw the line.

**GED TIP**

If a linear equation is not written with  $y$  on one side of the equation, use inverse operations to isolate  $y$ .

Example:  $2x + y = 15$   
Subtract  $2x$  from each side.  
 $y = -2x + 15$

**Graphing a Line**

Using the coordinate system, we can graph equations. When an equation has only two variables,  $x$  and  $y$ , and neither are raised to a power, the graph of the equation will be a line. When the graph of an equation is a straight line, the equation is a **linear equation**.

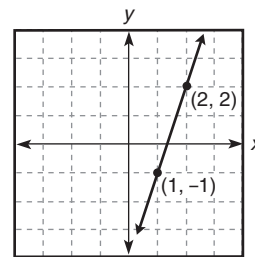
To graph an equation, you need to solve for two points on the line.

**Example 1:** Graph the equation  $y = 3x - 4$ .

1. Choose any value for  $x$  and solve for  $y$ . Let  $x = 1$ .
 

$y = 3(1) - 4$	If $x = 1$ , then $y = -1$ .
$y = 3 - 4$	The ordered pair for the first point is $(1, -1)$ .
$y = -1$	
2. Choose another value for  $x$  and solve for  $y$ . Let  $x = 2$ .
 

$y = 3(2) - 4$	If $x = 2$ , then $y = 2$ . The ordered pair for the second point is $(2, 2)$ .
$y = 6 - 4$	
$y = 2$	
3. Plot the points on a coordinate grid and draw a line through them.



The line is the graph of all the possible solutions for the equation  $y = 3x - 4$ . Arrows at both ends of the line indicate that the line continues in both directions. From this you can see that there are an infinite number of solutions to a linear equation.

Some linear equation problems don't require you to draw a graph.

**Example 2:** Point  $A$  lies at  $(5, -6)$  on a coordinate grid. The graph of which of the following equations passes through point  $A$ ?

- (1)  $y = -5x + 18$
- (2)  $y = -4x + 14$
- (3)  $y = -2x - 13$
- (4)  $y = x - 7$
- (5)  $y = 2x - 15$

Use the ordered pair given in the problem. Substitute the  $x$ -coordinate, 5, for  $x$  in each equation and solve for  $y$ . If  $y = -6$ , the value of the  $y$ -coordinate from the ordered pair, you have found the correct equation.

**Option (2)** is correct.
 
$$y = -4x + 14$$

$$y = -4(5) + 14$$

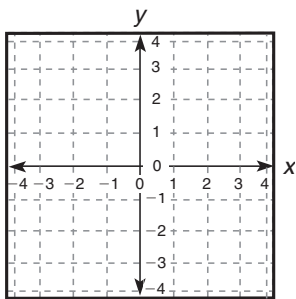
$$y = -20 + 14 = -6$$

## ALGEBRA ► PRACTICE 14

A. Fill in the  $y$  column in each table and graph the equation.

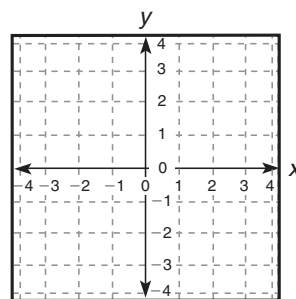
1.  $y = \frac{1}{2}x + 3$

If $x =$	then $y =$
-2	
0	
2	



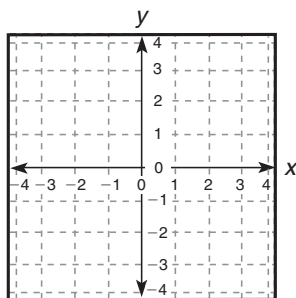
3.  $-2 + y = -x$

If $x =$	then $y =$
1	
2	
3	



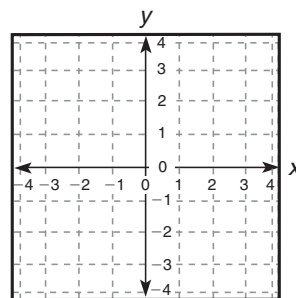
2.  $y + 3x = -1$

If $x =$	then $y =$
-1	
0	
1	



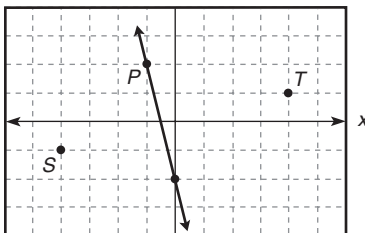
4.  $y = 3 - 2x$

If $x =$	then $y =$
0	
1	
2	



B. Choose the one best answer to each question.

Questions 5 and 6 refer to the following coordinate grid.



5. The graph of the equation  $y = \frac{1}{4}x$  will pass through which of the following pairs of points?

- (1) point S and  $(-1, 2)$
- (2) point S and  $(0, -2)$
- (3) point T and  $(0, 0)$
- (4) point T and  $(-1, 2)$
- (5) point T and  $(0, -2)$

6. Line P is the graph of which of the following equations?

- (1)  $y = 4x + 1$
- (2)  $y = -4x - 1$
- (3)  $y = 4x + 2$
- (4)  $y = -4x - 2$
- (5)  $y = -x + 2$

7. Point C is located at  $(-3, 5)$ . A graph of which of the following equations would pass through point C?

- (1)  $3x + 2y = 5$
- (2)  $2x + 3y = 9$
- (3)  $4x - 2y = 8$
- (4)  $5x - 3y = 0$
- (5)  $3x - 3y = 6$

Answers and explanations begin on page 679.

## ALGEBRA

## Slope of a Line

## Key Ideas

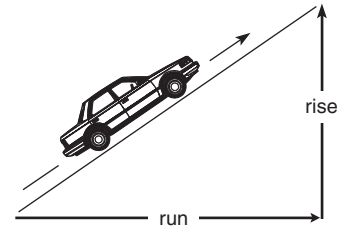
- Slope is the ratio of rise to run.
- Moving from left to right, a line that goes upward has a positive slope, and a line that moves downward has a negative slope.
- You can find slope by counting spaces and writing a ratio or by using the slope formula.

## GED TIP

Think of the slope formula this way: Write the difference of the  $y$ 's over the difference of the  $x$ 's. Just make sure that you always subtract the coordinates in the same order.

## Calculating Slope

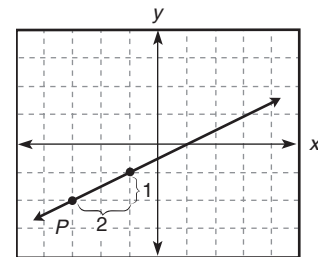
Slope is the measurement of the steepness of a line. Imagine a road going up a hill. If the road must climb upward over a short forward distance, the road will be very steep. Slope measures the relationship between **rise** (how high the road must climb) and **run** (the distance the road goes forward).



On a coordinate grid, a line that moves upward from left to right has a **positive slope**. A line that moves downward from left to right has a **negative slope**. You can find the slope of a line on a coordinate grid by writing the ratio of rise to run.

**Example 1:** What is the slope of line  $P$  shown on the coordinate grid?

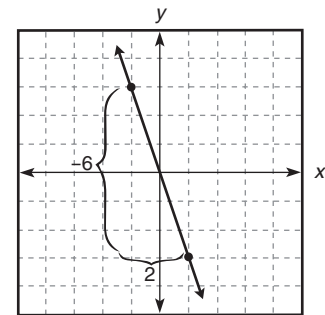
1. Find two points on line  $P$ . Count to find the rise and run. The line moves up 1 space for every 2 spaces it goes to the right.



2. Write the ratio:  $\frac{\text{rise}}{\text{run}} = \frac{1}{2}$ . The slope is  $\frac{1}{2}$ .

**Example 2:** What is the slope of line  $S$  shown on the coordinate grid?

1. Find any two points on line  $S$ . The line moves down 6 spaces (a negative direction) and 2 spaces to the right.



2. Write the ratio:  $\frac{\text{rise}}{\text{run}} = \frac{-6}{2} = -3$ .

The slope of line  $S$  is  $-3$ .

You can also find slope using the slope formula on the GED formulas page. The formula will appear as follows:

slope of a line =  $\frac{y_2 - y_1}{x_2 - x_1}$ , where  $(x_1, y_1)$  and  $(x_2, y_2)$  are two points on a line.

**Example 3:** A line passes through points at coordinates  $(1, 4)$  and  $(-5, 2)$ . What is the slope of the line?

1. Choose one point to be  $(x_1, y_1)$ . The other will be  $(x_2, y_2)$ . It doesn't matter which you choose. For this example,  $(x_1, y_1) = (1, 4)$  and  $(x_2, y_2) = (-5, 2)$ .

2. Substitute the values into the slope formula and solve:

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 4}{-5 - 1} = \frac{-2}{-6} = \frac{1}{3} \quad \text{The slope is } \frac{1}{3}.$$

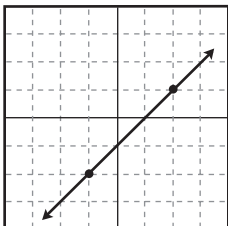
Since the slope is positive, you know that the line rises from left to right. You also know that it goes up 1 space for every 3 spaces it moves to the right.

In working with slope, there are a few special circumstances that you should memorize. A horizontal line, just like a flat stretch of roadway, has a slope of 0. The slope of a vertical line is undefined; in other words, our definition of slope will not work for a line that has no run at all.

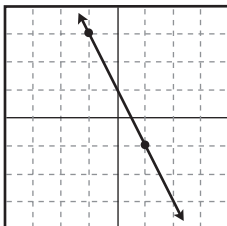
## ALGEBRA ► PRACTICE 15

A. Find the slope of each line.

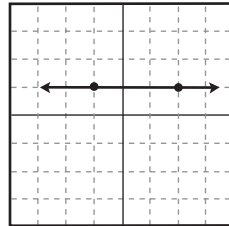
1.



2.



3.



B. Use the slope formula to find the slope of a line that passes through the following pairs of points.

4. (3,5) and (-1,2)

6. (4,2) and (2,2)

8. (1,4) and (-2,-2)

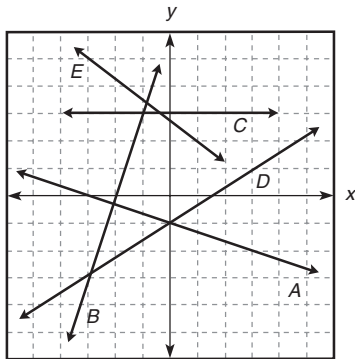
5. (0,2) and (4,0)

7. (6,1) and (0,3)

9. (4,-2) and (2,4)

C. Choose the **one best answer** for each question.

Question 10 refers to the following graph.



10. Which of the following lines shown on the graph has a slope of  $-\frac{1}{3}$ ?

- (1) line A
- (2) line B
- (3) line C
- (4) line D
- (5) line E

11. Line N passes through the following points: (0,4), (1,2), (2,0), and (3,-2). What is the slope of line N?

- (1) -4
- (2) -2
- (3) 1
- (4) 2
- (5) 4

12. Line L passes through point (1,0) and has a slope of 3. Which of the following points also lies on line L?

- (1) (0,3)
- (2) (1,4)
- (3) (1,3)
- (4) (2,3)
- (5) (2,5)

Answers and explanations begin on page 679.



## ALGEBRA

## Distance Between Points

## Key Ideas

- To find the distance between points, you can use a formula from the GED formulas page.
- You may need to use a calculator to find the square root in the last step of the formula.

## GED TIP

To estimate the distance between points, count the spaces of the rise and run of a line connecting the points. The distance must be greater than the rise or run but less than the sum of the rise and run.

## Using a Formula to Find the Distance Between Points

When solving problems using a coordinate grid, you may need to find the distance from one point to another. If two points are on the same vertical or horizontal line, you find the distance by counting spaces. To find the distance between points that are not on the same line, you need to use a formula. You can find this formula on the GED formulas page:

distance between points =  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ , where  $(x_1, y_1)$  and  $(x_2, y_2)$  are two points in a plane

Follow these steps to use the formula to find the distance between two points.

1. Choose a point to be  $(x_1, y_1)$  and a point to be  $(x_2, y_2)$ .
2. Subtract the first  $x$  from the second  $x$ , and square the difference.
3. Subtract the first  $y$  from the second  $y$ , and square the difference.
4. Add the squared numbers, and find the square root of the sum.

**Example 1:** Find the distance between points located at  $(1, 3)$  and  $(7, -5)$ .

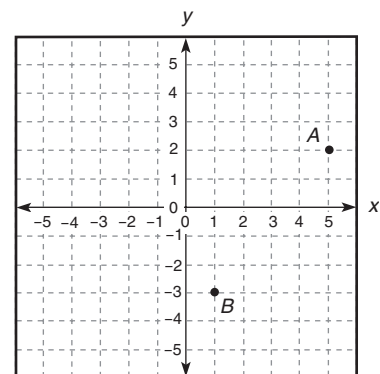
1. Let  $(1, 3) = (x_1, y_1)$  and  $(7, -5) = (x_2, y_2)$ .
2. Subtract the first  $x$  from the second, and square.  $7 - 1 = 6$ , and  $6^2 = 36$
3. Subtract the first  $y$  from the second, and square.  $-5 - 3 = -8$ , and  $-8^2 = 64$
4. Add the squares, and find the square root of the sum.  $36 + 64 = 100$ , and  $\sqrt{100} = 10$  The distance between the points is **10 units**.

In the example below, the same process is applied as the coordinates are substituted directly into the formula.

**Example 2:** In the coordinate grid shown below, what is the distance between points  $A$  and  $B$ , to the nearest tenth?

1. Point  $A$  is located at  $(5, 2)$  and point  $B$  is located at  $(1, -3)$ . Let  $(5, 2) = (x_2, y_2)$  and  $(1, -3) = (x_1, y_1)$ .
2. Use the formula:

$$\begin{aligned} \text{distance} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(5 - 1)^2 + (2 - (-3))^2} \\ &= \sqrt{4^2 + 5^2} \\ &= \sqrt{16 + 25} \\ &= \sqrt{41} \end{aligned}$$



3. Use a calculator to find the square root. On the *Casio fx-260*,

Press: 41  $\boxed{\text{SHIFT}}$   $\boxed{x^2}$  The display reads:  $\boxed{6.403124237}$

4. Round to the nearest tenth. 6.4 The distance between points *A* and *B* is approximately **6.4 units**.

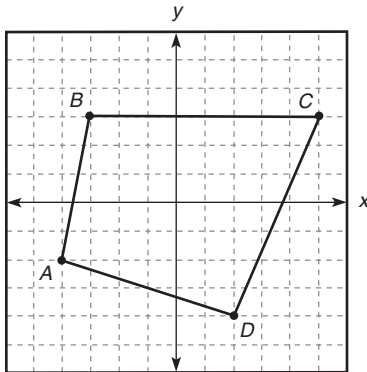
## ALGEBRA ► PRACTICE 16

**A.** Use the distance formula to find the distance between each pair of points. You MAY use a calculator. If necessary, round to the nearest tenth.

- |                     |                       |                      |
|---------------------|-----------------------|----------------------|
| 1. (3,4) and (-2,1) | 4. (-3,-1) and (-5,3) | 7. (-2,-2) and (4,5) |
| 2. (0,1) and (2,4)  | 5. (5,-2) and (0,0)   | 8. (4,0) and (-3,1)  |
| 3. (4,6) and (5,10) | 6. (-1,0) and (8,9)   | 9. (0,-4) and (1,-6) |

**B.** Choose the one best answer for each question.

Questions 10 and 11 refer to the following graph.



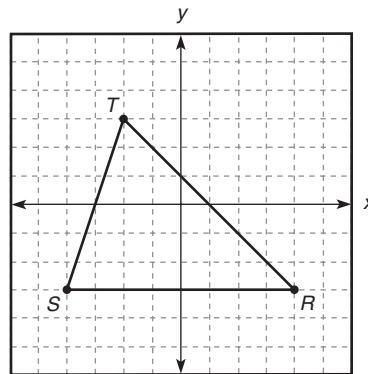
10. Figure *ABCD* is a quadrilateral. If a diagonal is drawn from point *A* to point *C*, what will the length of the diagonal be to the nearest whole unit?

- (1) 8
- (2) 9
- (3) 10
- (4) 11
- (5) 12

11. Point *E* will be drawn at the midpoint, or center, of the segment connecting points *B* and *C*. At what ordered pair will point *E* be located?

- (1) (-1,3)
- (2) (0,3)
- (3) (0.5,3)
- (4) (1,3)
- (5) (2,3)

Questions 12 and 13 are based on the graph.



12. If each square on the grid represents one square centimeter, what is the length, to the nearest one-tenth centimeter, of the segment connecting points *S* and *T*?

- (1) 6.0
- (2) 6.3
- (3) 6.8
- (4) 7.2
- (5) 8.1

13. Suppose point *V* is drawn at the origin of the coordinate grid. What is the distance in units from point *V* to point *S*?

- (1) 5
- (2) 6
- (3) 7
- (4) 8
- (5) 9

Answers and explanations begin on page 680.

## ALGEBRA

## Special Coordinate Grid Items

**Key Ideas**

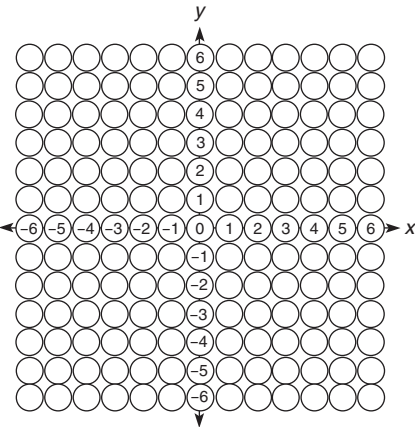
- Two questions on the GED Math Test will require you to plot points on a special grid.
- The grid will have rows of circles to represent the grid-lines formed by the  $x$ -axis and  $y$ -axis lines.
- Fill in the correct circle to plot your answer on the grid.

**Using the Coordinate Grid on Your Answer Sheet**

The GED Math Test contains two questions that must be answered on coordinate grids printed on the answer sheet. This grid is shown below.

Each row of circles represents a gridline on a standard coordinate grid. The  $x$ -axis and  $y$ -axis circles are labeled so that you can easily find the correct coordinates.

To use the grid, carefully fill in the circle at the coordinates of your answer. Make sure you do not make any stray marks on the grid. You should not draw lines or figures on the grid while you are solving the problem.

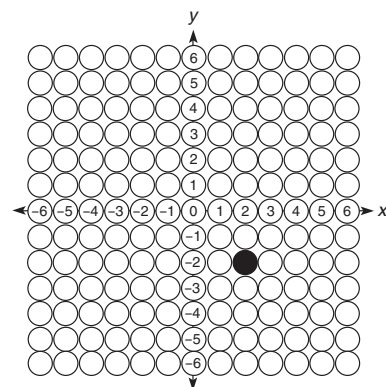
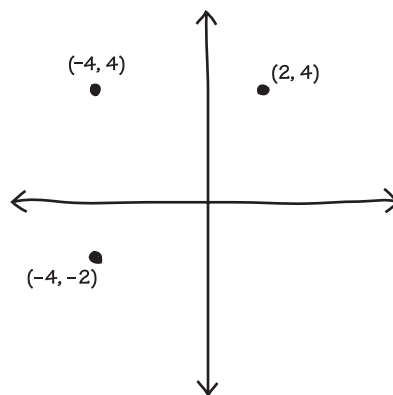


**Example:** Kate is drawing a square on a coordinate grid. She has already plotted three corners of the square at points indicated by the following ordered pairs:  $(-4,4)$ ,  $(2,4)$ , and  $(-4,-2)$ . At what point should she plot the location of the fourth corner? Graph your answer on the coordinate grid.

1. A square has four sides of equal length. Make a rough sketch to find the location of the ordered pairs given in the problem.
2. From the sketch, you can see that the missing corner will be located at  $(2,-2)$ . Fill in the circle that corresponds with this point on the coordinate grid.

**GED TIP**

*Making a quick sketch of a coordinate grid can help you solve problems. Draw the  $x$ -axis and  $y$ -axis, and estimate the placement of points.*



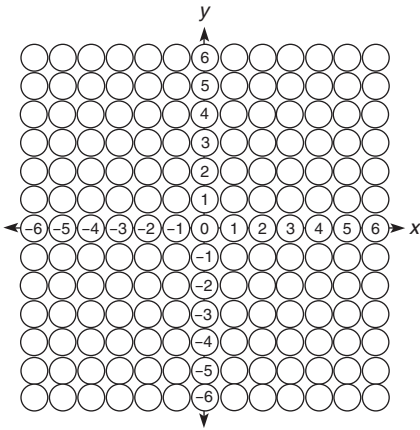
Special grid questions test your ability to plot points correctly on a coordinate grid. Before filling in a circle, check both the  $x$ -axis and  $y$ -axis to make sure you have chosen the correct circle. Erase any mistakes or changes completely.

# ALGEBRA ► PRACTICE 17

## A. Solve.

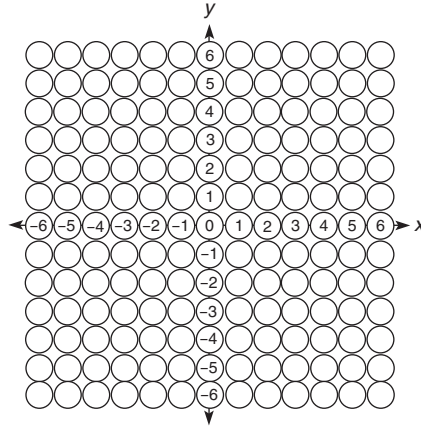
1. Bea uses a coordinate grid to plan designs for quilt squares. She begins by drawing a rectangle. Three of the corners are located at  $(-5,1)$ ,  $(2,1)$ , and  $(-5,5)$ . At what point is the fourth corner of the rectangle located?

Graph your answer on the coordinate grid.



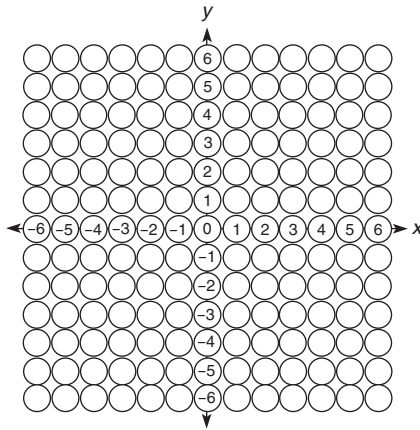
3. A company logo has a shaded background in the shape of a rectangle. When the rectangle is drawn on a coordinate grid, three of the corners are located at  $(-2,4)$ ,  $(5,4)$ , and  $(5,-4)$ . At what ordered pair should the final corner be located?

Graph your answer on the coordinate grid.



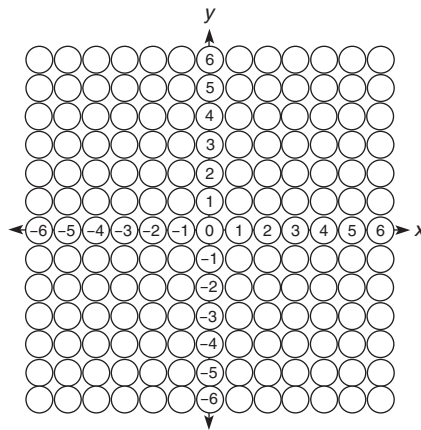
2. A line with a slope of  $\frac{1}{2}$  is drawn through point  $P$  at  $(-2,2)$ . Moving from left to right, what is the next ordered pair of whole numbers on the line?

Graph your answer on the coordinate grid.



4. A city map is placed on a coordinate grid. On the grid, a school is located at  $(4,-6)$ . Another school is located 9 spaces upward and 5 spaces to the left. What are the coordinates of the second school's location?

Graph your answer on the coordinate grid.



Answers and explanations begin on page 680.

## ALGEBRA

## Problem Solving

**Key Ideas**

- Guess and check is a strategy for answering complicated multiple-choice problems.
- Choose an answer from the options, and try the value in the problem. If it works, you have found the correct answer.

**GED TIP**

*Use your judgment. Do not use guess and check if you can quickly see how to solve the problem. Trying each answer choice may take longer than simply solving the problem.*

**Using Guess and Check**

One strategy that can help you save time on the more complicated algebra problems is **guess and check**. Guess and check means selecting one of the answer choices and trying that value in the problem. If you guess correctly, you can move on to the next question. If not, guess again. Guess and check is a good strategy for problems involving quadratic equations and expressions.

**Example 1:** Which of the following is a solution for the equation

$$2x^2 - 12 = 2x?$$

- (1) 4
- (2) 3
- (3) 0
- (4) -1
- (5) -3

To solve the problem, you would have to rewrite the equation so that the quadratic expression equals zero, factor the expression, and solve.

Instead, substitute each answer choice into the equation.

Option (1):	$2x^2 - 12 = 2x$	Option (2):	$2x^2 - 12 = 2x$
	$2(4)^2 - 12 = 2(4)$		$2(3)^2 - 12 = 2(3)$
	$20 \neq 8$		$6 = 6$

**Option (2) 3** makes the equation true.

Guess and check can also save time when writing an equation seems difficult.

**Example 2:** Terry is ten years older than his brother Tomas. Twenty years ago, Terry was twice as old as Tomas. How old is Terry now?

- (1) 25
- (2) 30
- (3) 40
- (4) 45
- (5) 60

Instead of writing an equation, try each age in the answer choices for Terry.

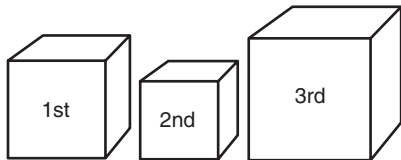
- (1) If Terry is 25 now, Tomas is 15. Twenty years ago, Tomas would not have been born.
- (2) If Terry is 30 now, Tomas is 20. Twenty years ago, Tomas would have been 0 years old, and Terry would have been 10.
- (3) If Terry is 40 now, Tomas is 30. Twenty years ago, Tomas would have been 10, and Terry would have been 20, which is twice as old as 10.

Therefore, **option (3) 40** is correct.

## ALGEBRA ► PRACTICE 18

### A. Use guess and check to solve the following problems.

- A number divided by 2 is equal to 12 less than the original number. What is the number?
  - 12
  - 20
  - 24
  - 28
  - 36
- For a fund-raiser, Sandra raised three times as much money as Barbara, and Barbara raised \$50 more than Matt. Together they raised \$950. How much money did Barbara raise?
  - \$100
  - \$150
  - \$175
  - \$200
  - \$325
- The three packages below weigh a total of 15 pounds.
- Nelson is twice as old as Maria. Six years ago, Nelson was five times as old as Maria. How old was Nelson six years ago?
  - 5
  - 10
  - 15
  - 20
  - 25
- Which of the following is a solution for the quadratic equation  $2x^2 + x - 15 = 0$ ?
  - 3
  - 1
  - 2
  - 3
  - 5
- An amusement park sells adults' and children's passes. An adult's pass is \$25, and a child's pass is \$15. A group spent \$440 on 20 passes. How many children's passes did the group purchase?
  - 3
  - 5
  - 6
  - 9
  - 14



The first package weighs twice as much as the second package. The third package weighs three times as much as the second package. How many pounds does the first package weigh?

- $1\frac{1}{2}$
  - 2
  - 4
  - 5
  - $6\frac{1}{2}$
- Hannah scored a total of 170 points on two math tests. The score of the first test was 6 points lower than the score of the second test. How many points did Hannah score on the first test?
  - 76
  - 82
  - 88
  - 90
  - 94
- The rectangular garden below is twice as long as it is wide. If the total distance around the garden is 120 feet, what is the width of the garden in feet?

Length =  $2 \times$  Width

Width = ?

  - 10
  - 15
  - 20
  - 30
  - 40

Answers and explanations begin on page 680.

## DECIMALS AND FRACTIONS

## Decimal Basics

**Key Ideas**

- The decimal point separates the whole number from the decimal part.
- To round decimals, use the same rules as with rounding whole numbers.
- Adding zeros to the right of the last digit after the decimal does not change the number's value.

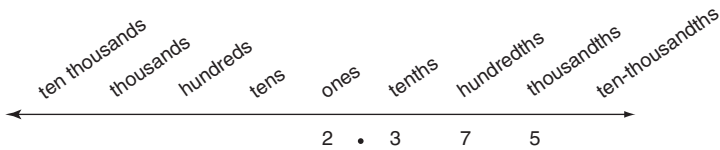
**GED TIP**

The GED Math Test may show a zero written before the decimal point. The zero does not change the value of the number. Example:  $0.75 = .75$

**The Decimal System**

**Decimals** are numbers that use place value to show amounts less than 1. You already use decimals when working with money. For example, in the amount \$10.25, you know that the digits to the right of the **decimal point** represent cents, or hundredths of a dollar.

The first four decimal place values are labeled on the chart below.



The number 2.375 is shown on the chart. Read *and* in place of the decimal point. After reading the decimal part, say the place value of the last decimal digit. This number would be read “two *and* three hundred seventy-five *thousandths*.”

**Rounding**

Round decimals the same way you round whole numbers.

**Example 1:** A calculator display reads 3.62835. Round to the hundredths place.

1. Look at the digit to the right of the hundredths place.  $3.62\boxed{8}35$
2. If the digit to the right is 5 or greater, round up. If the digit is less than 5, don't change the number. Then drop all digits to the right of the place you are rounding to.   
 Since 8 is greater than 5, round up.  $3.62835$  rounds to **3.63**

**Comparing and Ordering**

Comparing decimals is similar to comparing whole numbers.

**Example 2:** Matt ran the 400-meter race in 45.8 seconds. Alonzo ran the same race in 45.66 seconds. Which runner had the faster time?

1. Line up the decimal points. Add a zero at the **end** of 45.8 so that both times have the same number of digits after the decimal.   
 45.80  
 45.66
2. Compare the decimal parts of the numbers as though they were whole numbers. **Alonzo's time was faster.**   
 80 is greater than 66, so 45.8 is greater than 45.66



When you compare more than two numbers, it is helpful to compare one place-value column at a time, working from left to right.

**Example 3:** Arrange the numbers 0.85, 1.8, 0.8, and 0.819 in order from greatest to least.

- |   |                                       |
|---|---------------------------------------|
| 1. Write the numbers in a column, lining up the decimal points.<br>Add zeros so that the numbers have the same number of decimal places.  | 0.850<br>1.800<br>0.800<br>0.819      |
| 2. Compare the digits, working from left to right. Only 1.8 has a whole number part, so it is greatest. The remaining numbers each have 8 in the tenths column. Looking at the hundredths column, 0.85 is next, followed by 0.819. The least number is 0.8. | In order: 1.8<br>0.85<br>0.819<br>0.8 |

---

## DECIMALS AND FRACTIONS ► PRACTICE 1

**A. Round these numbers as directed.**

- |   |  |
|---|--|
| 1. Round 3.75 to the tenths place.  | 4. Round 0.66667 to the nearest thousandth.                                  |
| 2. Round 5.908 to the ones place.   | 5. Round 8.125 to the nearest tenth.   |
| 3. A calculator display reads 0.4285714.<br>Round to the nearest hundredth. | 6. A calculator display reads 2.7142857.<br>Round to the nearest thousandth. |

**B. In each of the following pairs, which number is greater?**

- |                  |                  |                     |
|------------------|------------------|---------------------|
| 7. 0.45 or 0.449 | 9. 4.68 or 4.086 | 11. 1.0275 or 1.029 |
| 8. 0.008 or 0.08 | 10. 0.75 or 1.85 | 12. 0.14 or 0.104   |

**C. Write these numbers in order from least to greatest.**

- |                           |                            |
|---------------------------|----------------------------|
| 13. 5.6 5.08 5.8 5.802    | 15. 14.005 4.52 4.8 4.667  |
| 14. 0.1136 0.12 0.2 0.115 | 16. 0.8023 0.8 0.803 0.823 |

**D. Choose the one best answer to each question.**

- |  |   |
|--|---|
| 17. In a circuit board assembly, the weights of three parts are 0.572 gram, 0.0785 gram, and 0.6 gram. Which of the following lists the weights in order from <u>greatest to least</u> ? | 18. Which of the following correctly shows 1.3815 rounded to the nearest hundredth? |
| (1) 0.0785 g, 0.572 g, 0.6 g   | (1) 1.4   |
| (2) 0.572 g, 0.0785 g, 0.6 g   | (2) 1.39  |
| (3) 0.6 g, 0.0785 g, 0.572 g   | (3) 1.382   |
| (4) 0.6 g, 0.572 g, 0.0785 g   | (4) 1.381   |
| (5) 0.572 g, 0.6 g, 0.0785 g   | (5) 1.38  |

**Answers and explanations begin on page 665.**



## DECIMALS AND FRACTIONS

## Decimal Operations

**Key Ideas**

- Always add and subtract like place-value columns.
- Always line up the decimal points when you write a problem in columns.
- When adding or subtracting, place the decimal point in the answer directly below the decimal point in the problem.

**GED TIP**

*To make sure that your answer makes sense, mentally round the numbers to the nearest whole number and then add or subtract. The result should be close to your answer.*

**Addition and Subtraction**

Adding decimals is much like adding whole numbers. The trick is to make sure you have lined up the place-value columns correctly. You can do this by writing the numbers in a column and carefully lining up the decimal points.

**Example 1:** Add  $0.37 + 13.5 + 2.638$ .

1. Write the numbers in a column, lining up the decimal points.
 
$$\begin{array}{r} 0.370 \\ 13.500 \\ + 2.638 \\ \hline \end{array}$$
2. You may add placeholder zeros so that the decimals have the same number of decimal places.
 
$$\begin{array}{r} 11 \\ 0.370 \\ 13.500 \\ + 2.638 \\ \hline 16.508 \end{array}$$
3. Add. Start on the right and add each column. Regroup, or carry, as you would with whole numbers.
4. Place the decimal point in the answer directly below the decimal points in the problem.

To subtract decimals, write the numbers in a column with the greater number on top. Make sure the decimal points are in a line.

**Example 2:** Find the difference between 14.512 and 8.7.

1. Write the numbers in a column, lining up the decimal points. Add placeholder zeros so that the numbers have the same number of decimal places.
 
$$\begin{array}{r} 14.512 \\ - 8.700 \\ \hline \end{array}$$
2. Subtract. Regroup, or borrow, as needed. Place the decimal point in the answer directly in line with the decimal points in the problem.
 
$$\begin{array}{r} 13\ 15 \\ \cancel{14}.512 \\ - 8.700 \\ \hline 5.812 \end{array}$$

The greater number may have fewer or no decimal places. In the next example, a decimal is subtracted from a whole number.

**Example 3:** What does 9 minus 3.604 equal?

1. Line up the place-value columns. Put a decimal point after the whole number 9 and add placeholder zeros.
 
$$\begin{array}{r} 9.000 \\ - 3.604 \\ \hline \end{array}$$
2. Subtract, regrouping as needed. Place the decimal point in the answer.
 
$$\begin{array}{r} 8\ 9\ 9\ 10 \\ 9.\ 0\ 0\ 0 \\ - 3.\ 6\ 0\ 4 \\ \hline 5.\ 3\ 9\ 6 \end{array}$$

## DECIMALS AND FRACTIONS ► PRACTICE 2.1

### A. Solve.

1. 
$$\begin{array}{r} 4.025 \\ + 3.971 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 8.04 \\ - 2.19 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 17.294 \\ + 0.8 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 3.8 \\ - 2.905 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 6.5 \\ + 4.008 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 8.5 \\ - 1.074 \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 4.07 \\ + 1.047 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 14.64 \\ - 10.8 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 2.8 \\ + 9.46 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 10 \\ - 7.89 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 17.52 \\ + 3.8 \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 100.5 \\ - 98.15 \\ \hline \end{array}$$

13.  $0.236 + 2.4 + 2.87 =$

17.  $1.02 - 0.87 =$

21.  $0.01 + 2.052 + 0.96 + 1.5 =$

14.  $38.06 - 16.9 =$

18.  $0.45 + 1.8 + 0.07 + 2.56 =$

22.  $12.9 - 10.54 =$

15.  $0.006 + 0.09 + 0.549 =$

19.  $12.5 - 0.7 =$

23.  $0.68 + 12.3 + 4.9 =$

16.  $8.5 - 6.074 =$

20.  $25 - 10.984 =$

24.  $32.9 - 15.675 =$

### B. Choose the one best answer to each question.

25. James ran 3 miles. His times for the individual miles were 7.2 minutes, 6.8 minutes, and 8.25 minutes. How long did it take him, in minutes, to run the 3-mile distance?

- (1) 9.65
- (2) 22.25
- (3) 22.7
- (4) 23.35
- (5) 96.5

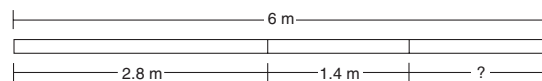
26. Claudia earns overtime pay when she works more than 40 hours in one week. How many hours of overtime pay did she work for the week of March 4?

#### Work Record for March 4–10

March 4	8.5
March 5	Off
March 6	9.25
March 7	8.75
March 8	10
March 9	Off
March 10	7.75

- (1) 44.25
- (2) 40.0
- (3) 8.85
- (4) 4.25
- (5) 2.25

27. A plumber cut two lengths of pipe measuring 2.8 and 1.4 meters from a 6-meter length.



Assuming there was no waste when the cuts were made, what is the length in meters of the remaining piece?

- (1) 1.8
- (2) 3.2
- (3) 4.2
- (4) 7.4
- (5) 10.2

28. Mona purchased the following art supplies: a storage box for \$16.98, a set of art markers for \$31.78, and a pad of paper for \$6.50. What was the cost of the three items?

- (1) \$31.78
- (2) \$48.76
- (3) \$53.26
- (4) \$55.26
- (5) \$61.76

Answers and explanations begin on page 665.

## MULTIPLICATION AND DIVISION

The rules you used to multiply whole numbers can be used to multiply decimals. You don't have to line up the decimal points. You will wait until you are finished multiplying before you place the decimal point in the answer. The number of decimal places in the answer equals the total number of decimal places in the numbers you are multiplying.

**Example 4:** Find the product of 2.6 and 0.45.

1. Set up the problem as though you were multiplying the whole numbers 26 and 45.  
$$\begin{array}{r} 2.6 \\ \times .45 \\ \hline \end{array}$$
2. Ignore the decimal points while you multiply.
3. Now count the decimal places in the numbers you multiplied. The number 2.6 has one decimal place, and 0.45 has two decimal places, for a total of three.  
$$\begin{array}{r} 2.6 \\ \times .45 \\ \hline 130 \\ 1040 \\ \hline 1.170 \end{array}$$
4. Starting from the right, count three places to the left and insert the decimal point.

When you divide decimals, you must figure out where the decimal point will go in the answer before you divide.

**Example 5:** Divide 14.4 by 6.

1. Set up the problem. Since the divisor (the number you are dividing by) is a whole number, place the decimal point in the answer directly above the decimal point in the dividend (the number you are dividing).  
$$\begin{array}{r} 2.4 \\ 6 \overline{)14.4} \\ \underline{-12} \\ 24 \\ \underline{-24} \\ 0 \end{array}$$
2. Divide. Use the rules you learned for dividing whole numbers.

If the divisor is a decimal, you must move the decimal points in both the divisor and the dividend before you divide.

**Example 6:** Divide 4.9 by 0.35.

1. Set up the problem. There are two decimal places in the divisor. Move the decimal point in *both* the divisor and the dividend two places to the right. Note that you need to add a zero in the dividend in order to move the decimal two places.  
$$\begin{array}{r} .35 \overline{)4.90} \end{array}$$
2. Place the decimal point in the quotient directly above the decimal point in the dividend.  
$$\begin{array}{r} 14. \\ 35 \overline{)490.} \\ \underline{-35} \\ 140 \\ \underline{-140} \\ 0 \end{array}$$
3. Divide.

**Note:** You may not need to finish dividing in order to choose the correct answer. You may be able to eliminate all but one of the answer choices after only one or two division steps.

## DECIMALS AND FRACTIONS ► PRACTICE 2.2

### A. Solve.

1. 
$$\begin{array}{r} 5.3 \\ \times 0.5 \\ \hline \end{array}$$

4.  $6\overline{)3.12}$

7. 
$$\begin{array}{r} 6.25 \\ \times 1.4 \\ \hline \end{array}$$

10.  $1.25\overline{)30}$

2. 
$$\begin{array}{r} 64 \\ \times 0.2 \\ \hline \end{array}$$

5.  $8\overline{)28.8}$

8. 
$$\begin{array}{r} 13.5 \\ \times 0.25 \\ \hline \end{array}$$

11.  $2.8\overline{)39.76}$

3. 
$$\begin{array}{r} 12.4 \\ \times 0.04 \\ \hline \end{array}$$

6.  $5\overline{)20.45}$

9. 
$$\begin{array}{r} 9.62 \\ \times 1.005 \\ \hline \end{array}$$

12.  $0.003\overline{)47.4}$

13.  $15.5 \times 2.2 =$

16.  $1.32 \div 0.5 =$

19.  $3.36 \times 1.1 =$

14.  $0.944 \div 0.4 =$

17.  $2.75 \times 0.6 =$

20.  $15.03 \div 15 =$

15.  $2.05 \times 0.32 =$

18.  $12.825 \div 3 =$

21.  $0.12 \times 0.06 =$

### B. Choose the one best answer to each question.

22. One container of floor cleaner holds 3.79 liters. If Zachary bought 4 containers, how many liters of cleaner did he buy?

- (1) 0.9475
- (2) 7.79
- (3) 9.48
- (4) 12.83
- (5) 15.16

23. Ribbon costs \$0.45 per foot. A sewing project calls for 20.5 feet of ribbon. To the nearest cent, what will be the cost of the ribbon for the project?

- (1) \$0.92
- (2) \$9.23
- (3) \$9.90
- (4) \$45.56
- (5) \$92.25

24. Armando drove 278.7 miles over a 3-day period. On average, how many miles did he drive each day?

- (1) 9.3
- (2) 90.3
- (3) 92.9
- (4) 107.6
- (5) 836.1

Questions 25 and 26 are based on the following information.

Cereal	Net Weight	Servings per Box
Toasted Oats	22.8 oz	19
Crisp Rice	16.9 oz	13
Honey Mix	12.5 oz	10

25. A box of Toasted Oats cereal is priced at \$4.94. What is the cost per serving? (*Hint:* Divide the price by the number of servings.)

- (1) \$0.49
- (2) \$0.38
- (3) \$0.29
- (4) \$0.26
- (5) \$0.22

26. Lee buys 4 boxes of Honey Mix cereal. How many ounces of cereal did she buy?

- (1) 31.25
- (2) 50.0
- (3) 67.6
- (4) 91.2
- (5) 208.8

Answers and explanations begin on page 665.

## DECIMALS AND FRACTIONS

## Fraction Basics

**Key Ideas**

- The bottom number of a fraction tells how many parts the group or object has.
- The top number tells how many parts you are working with.
- When the top number is greater than the bottom number, the fraction is greater than 1.

**ON THE GED**

If you have trouble visualizing the fractions in a problem, draw a quick sketch of the information presented in the problem.

**Understanding Fractions**

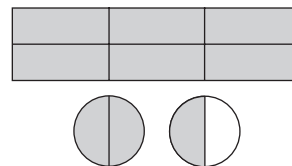
A **fraction** uses two numbers to represent part of a whole. The bottom number, called the **denominator**, tells how many equal parts are in the whole group or item. The top number, called the **numerator**, tells how many parts you are working with.

There are 4 equal parts in this rectangle. Since 3 are shaded, we say that  $\frac{3}{4}$  of the rectangle is shaded.



In a proper fraction, the numerator is less than the denominator. A **proper fraction** represents a quantity less than 1. An *improper fraction* is equal to or greater than 1.

There are 6 equal parts in the figure, and 6 are shaded; therefore,  $\frac{6}{6}$  of the figure is shaded.  $\frac{6}{6} = 1$



In this grouping, each figure is divided into 2 equal parts. A total of 3 parts are shaded, so  $\frac{3}{2}$  are shaded.

A **mixed number** is another way to show an amount greater than 1. It consists of a whole number and a proper fraction. Another name for the shaded portion in the last figure is  $1\frac{1}{2}$ . The improper fraction  $\frac{3}{2}$  equals  $1\frac{1}{2}$ .

You can also change an improper fraction to a whole or mixed number.

**Example 1:** Change  $\frac{16}{5}$  to a mixed number.

1. Divide the numerator (16) by the denominator (5).  $16 \div 5 = 3$  r1  
Since 16 is not evenly divisible by 5, there is a remainder of 1.
2. The answer becomes the whole number, and the remainder becomes the numerator of the proper fraction. The denominator is the same as the original fraction.  $\frac{16}{5} = 3\frac{1}{5}$

You can also change a mixed number to an improper fraction.

**Example 2:** Change  $7\frac{2}{3}$  to an improper fraction.

1. Multiply the whole number (7) by the denominator of the fraction (3), and add the numerator (2).  $7 \times 3 = 21$   
 $21 + 2 = 23$
2. Write the sum over the denominator of the original fraction.  $7\frac{2}{3} = \frac{23}{3}$

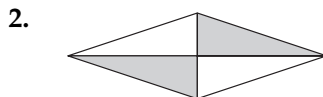
To perform operations with fractions, you need to be able to write equal fractions in higher or lower terms. The **terms** are the numerator and the denominator. A fraction is **reduced to lowest terms** when the two terms do not have any common factor except 1.

To **raise** a fraction, multiply both terms by the same number:  $\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

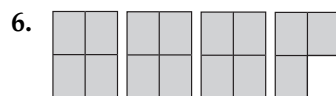
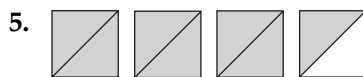
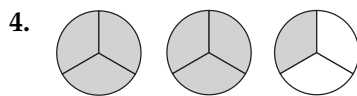
To **reduce** a fraction, divide both terms by the same number:  $\frac{10}{15} = \frac{10 \div 5}{15 \div 5} = \frac{2}{3}$

## DECIMALS AND FRACTIONS ► PRACTICE 3

A. Write a proper fraction for the shaded portion of each figure.



B. Write an improper fraction and a mixed number for the shaded portion of each figure.



C. Write improper fractions as mixed numbers and mixed numbers as improper fractions.

7.  $\frac{17}{3} =$       9.  $\frac{24}{6} =$       11.  $\frac{19}{4} =$       13.  $\frac{43}{9} =$       15.  $\frac{33}{7} =$

8.  $3\frac{3}{5} =$       10.  $5\frac{2}{9} =$       12.  $2\frac{5}{12} =$       14.  $1\frac{3}{4} =$       16.  $5\frac{7}{10} =$

D. Write an equal fraction with the given denominator.

17.  $\frac{3}{4} = \frac{\quad}{16}$       18.  $\frac{1}{3} = \frac{\quad}{21}$       19.  $\frac{4}{5} = \frac{\quad}{60}$       20.  $\frac{3}{8} = \frac{\quad}{40}$       21.  $\frac{6}{25} = \frac{\quad}{100}$

(Hint:  $4 \times ? = 16$ )

E. Reduce each fraction to lowest terms.

22.  $\frac{21}{28} =$       23.  $\frac{4}{24} =$       24.  $\frac{12}{20} =$       25.  $\frac{26}{30} =$       26.  $\frac{60}{90} =$

F. Choose the one best answer to each question.

27. Eighteen out of every 24 people surveyed say they went to at least one movie in December. What fraction of the people surveyed went to a movie in December?

- (1)  $\frac{3}{4}$
- (2)  $\frac{2}{3}$
- (3)  $\frac{1}{2}$
- (4)  $\frac{1}{3}$
- (5)  $\frac{1}{4}$

28. Which of the following fractions equals  $\frac{2}{5}$ ?

- (1)  $\frac{15}{100}$
- (2)  $\frac{30}{100}$
- (3)  $\frac{40}{100}$
- (4)  $\frac{65}{100}$
- (5)  $\frac{80}{100}$

Answers and explanations begin on page 665.

## Science

The GED Science Test evaluates your ability to understand and interpret science information. You will have 80 minutes to answer 50 questions that are based on brief reading passages or graphics such as diagrams, tables, graphs, and maps.

The questions are based on content in the areas of life science, earth and space science, and physical science (chemistry and physics). They are all in multiple-choice format.

### Content Areas

**Life Science (45%)** Almost half the questions on the Science Test cover life science topics. These topics may include cell structures and processes, the human body, health and nutrition, heredity and reproduction, genetics and DNA, evolution and natural selection, and ecosystems.

**Earth and Space Science (20%)** One-fifth of the questions are based on major topics such as the structure of Earth, plate tectonics, geological cycles and processes, renewable and nonrenewable natural resources, weather and climate, the solar system, and the universe.

**Physical Science (35%)** About one-third of the questions cover important topics in chemistry and physics. These topics may include atoms and molecules, the properties and states of matter, chemical reactions, energy and work, motion and forces, waves, electricity, and magnetism.

Many of the questions on the test are based on themes that apply across the science content areas:

- The history and nature of science
- Science in personal and human perspectives
- Science as inquiry—especially focusing on the scientific method
- Science and technology
- Unifying concepts and processes, such as constancy and change

In addition to studying this book, you can prepare for the GED Science Test by paying attention to news programs on the radio and television and by reading newspapers and news magazines. There are often stories in the news that involve science topics, especially new developments in genetics, health, space exploration, and astronomy. Pay special attention to graphs, diagrams, and maps that you see in the media because 25 out of 50 questions on the test are based on graphics alone or graphics and text together.

From March 4 to March 10, how many books were checked out from the South and West branches combined?

- There are  $4\frac{1}{2}$  symbols for the South Branch and 9 symbols for the West branch. Add.  
 $4\frac{1}{2} + 9 = 13\frac{1}{2}$  symbols
- Find the value of the symbols. The key states that each symbol equals 150 books. Multiply by 150.  $13\frac{1}{2} \times 150 = 2025$  books

## DATA ANALYSIS ► PRACTICE 1

A. Use the table on page 412 to answer questions 1 and 2. Use the pictograph on page 412 to answer questions 3 and 4. You **MAY** use a calculator.

- On average, how many people were there per square mile in Bell County in 2000?
- To the nearest percent, what was the percent of decrease in Evans County's population from 1990 to 2000?
- How many more books were checked out from North Branch than from South Branch during the week of March 4?
- How many books were checked out from all three branches combined?

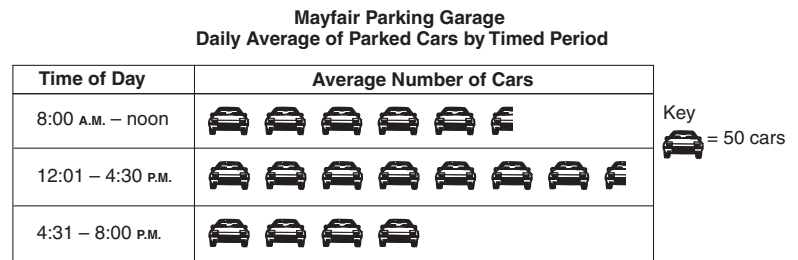
B. Choose the **one best answer** to each question.

Questions 5 and 6 refer to the following table.

Percent of 3-year-old children with school-readiness skills for the years 1994 and 2000		
	1994	2000
Recognizes all letters	13%	15%
Counts to 20 or higher	37%	41%
Writes own name	22%	24%
Reads or pretends to read	68%	70%

- How many more children were able to count to 20 or higher in 2000 than in 1994?  
 (1) 2  
 (2) 4  
 (3) 37  
 (4) 63  
 (5) Not enough information is given.
- A community had 350 three-year-old children in 2000. Based on the table, how many were able to write their own names?  
 (1) 22  
 (2) 77  
 (3) 84  
 (4) 140  
 (5) 273

Questions 7 and 8 refer to the following graph.



- How many cars are parked in the garage from 12:01 to 4:30 P.M.?  
 (1) 275  
 (2) 350  
 (3) 375  
 (4) 650  
 (5) Not enough information is given.
- How many more cars are parked from 8 A.M. to noon than are parked after 4:30 P.M.?  
 (1) 75  
 (2) 100  
 (3) 175  
 (4) 200  
 (5) 475

Answers and explanations begin on page 671.



## DATA ANALYSIS

## Bar and Line Graphs

## Key Ideas

- A bar graph uses bars to represent numbers.
- To find the value of a bar, compare its length to the scale shown on one of the axis lines. Estimate the value.
- A double-bar graph compares groups of data. Read the key to find the meaning of the bars.

## GED TIP

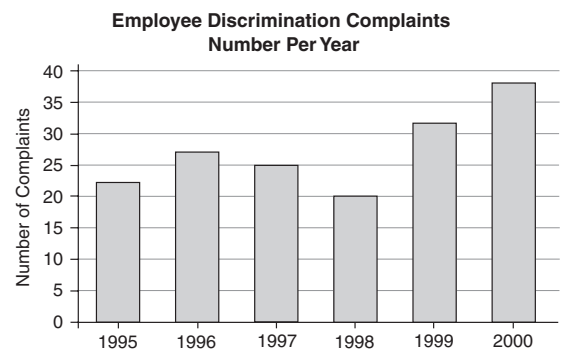
*You may not be able to find the exact value of a bar. If the bar falls about halfway between two numbers on the scale, use a whole number that lies in the middle.*

## Working with Bar Graphs

A **bar graph** uses bars to represent values. Bar graphs have two axis lines. One line shows a number scale, and the other shows labels for the bars. By comparing the length of a bar to the scale, you can estimate what value the bar represents.

**Example 1:** A national corporation made a bar graph (shown below) to show the number of discrimination complaints made by employees during a six-year period. About how many more complaints were made in 1999 than in 1998?

1. **Read the labels.** Each bar represents the number of complaints made within a year. The years are shown beneath the bars.
2. **Analyze the data.** Compare the bars for 1998 and 1999 to the scale. There were 20 complaints in 1998 and about 32 complaints in 1999.
3. **Use the data.** Subtract:  $32 - 20 = 12$ . There were **about 12 more** complaints in 1999 than in 1998.

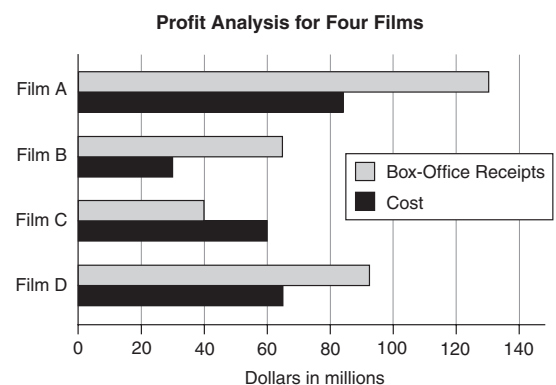


A **double-bar graph** compares more than one type of data.

**Example 2:** A studio released four films in one year. The graph below compares the cost of making each movie to its box-office receipts, or ticket sales. Film B's cost is what percent of its box-office receipts?

1. **Read the labels.** Read the key to find the meaning of the bars. Notice that the scale represents millions of dollars.
2. **Analyze the data.** Film B's cost is about \$30 million. It brought in about \$65 million in receipts.
3. **Use the data.** Find what percent \$30 is of \$65.  

$$\frac{\$30}{\$65} \approx 0.462 \approx 46\%$$



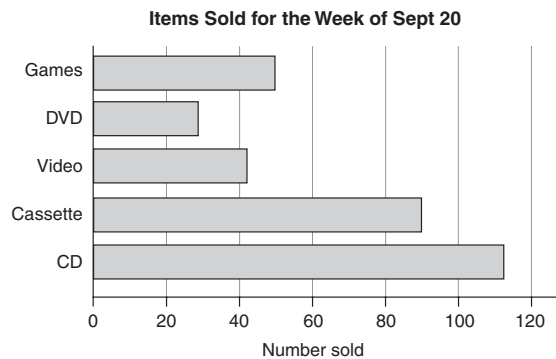
## DATA ANALYSIS ► PRACTICE 2.1

A. For questions 1 through 3, use the bar graph entitled “Employee Discrimination Complaints” on page 414. For questions 4 through 6, use the bar graph entitled “Profit Analysis for Four Films” on page 414.

1. To the nearest ten, how many employee discrimination complaints were there in 1995 and 1996?
2. About how many more complaints were there in 2000 than in 1995?
3. By what percent did the number of complaints decrease from 1997 to 1998?
4. About how much more did it cost to make Film A than Film D?
5. Which film made the greatest amount of profit? (profit = receipts – cost)
6. Film C’s cost was what percent of its box-office receipts?

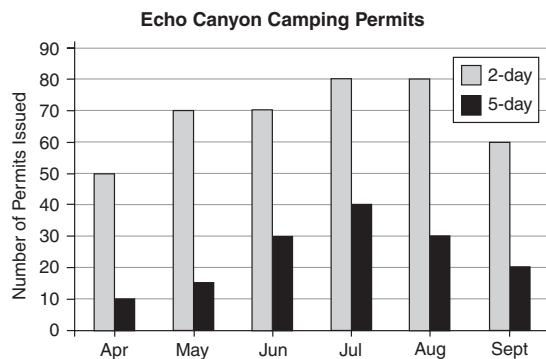
B. Choose the one best answer to each question.

Questions 7 and 8 refer to the following graph.



7. Approximately how many more CDs were sold than videos and DVDs combined?
  - (1) 24
  - (2) 32
  - (3) 41
  - (4) 70
  - (5) 88
8. One-half of the games sold during the week of September 20 were on sale for \$16. The rest sold for the full price of \$24. Approximately how much money did the store take in for games sold during the week of September 20?
  - (1) \$400
  - (2) \$500
  - (3) \$750
  - (4) \$1000
  - (5) \$2000

Questions 9 and 10 refer to the following graph.



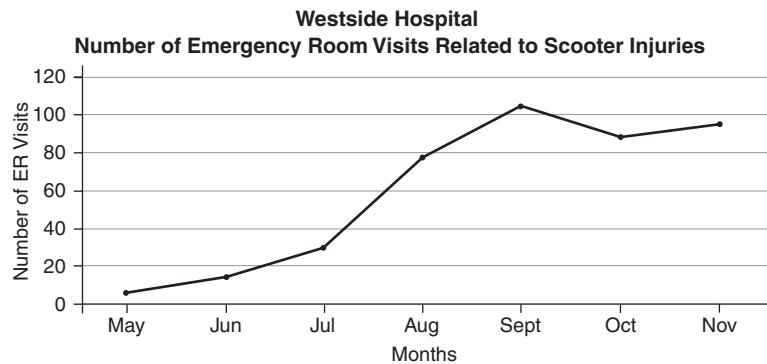
9. In May, what was the ratio of the number of 2-day permits to the number of 5-day permits?
  - (1) 2:5
  - (2) 3:14
  - (3) 3:17
  - (4) 14:3
  - (5) 14:17
10. In which month was there a total of 80 permits issued?
  - (1) May
  - (2) June
  - (3) July
  - (4) August
  - (5) September

**Answers and explanations begin on page 671.**

## Working with Line Graphs

A **line graph** is useful for showing changes over time. By analyzing the rise and fall of the line, you can tell whether something is increasing, decreasing, or staying the same. Like a bar graph, a line graph has two axis lines. One is marked with a scale; the other is marked in regular time intervals.

**Example 1:** The graph below shows the number of patients who visited an emergency room for the treatment of scooter-related injuries.



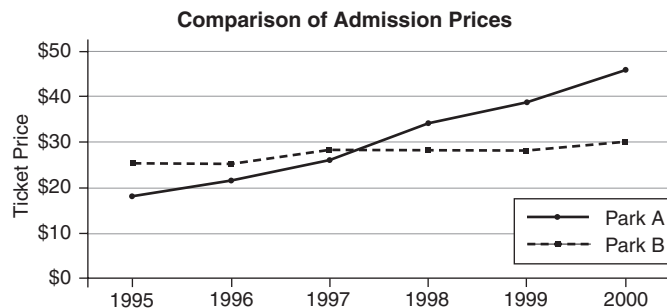
In which month did the greatest increase in scooter-related injuries occur?

The points on the graph are positioned above the months, which are arranged in calendar order. By examining the line that connects the points, you can tell whether there was an increase or decrease from one month to the next.

A steeper line shows a greater increase; therefore, the **greatest increase was during July**. In fact, there were nearly 80 scooter-related injuries by the end of July and about 30 at the beginning of July, for an increase of 50 injuries.

If a line graph has more than one line, a key will tell you what the lines represent.

**Example 2:** The graph below shows the changes in ticket prices for two amusement parks.



What was the last year in which the admission price to Park B was greater than the admission price to Park A?

The admission prices for Park A are represented by a solid line. Park B's prices are shown with a dotted line. The graph begins in 1995. In 1995, Park B's ticket price is greater than Park A's. Follow the two lines to the right. Between 1997 and 1998, the lines cross, and Park A's prices climb higher than Park B's. **The year 1997** was the last time that Park B charged more than Park A for a ticket.

**Note:** The steepest line shows the greatest increase or decrease, but it may not show the greatest percent of change. When the original value is small, a small change may result in a high percent of change.

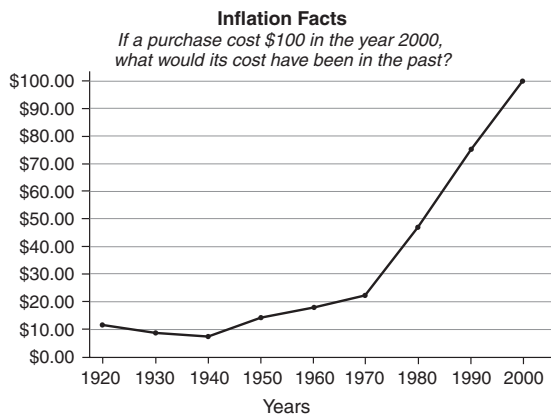
## DATA ANALYSIS ► PRACTICE 2.2

A. For questions 1 through 3, use the graph from Westside Hospital on page 416. For questions 4 through 6, use the graph “Comparison of Admission Prices” on page 416.

- In which month did the number of scooter-related injuries decrease?
- To the nearest ten, how many emergency room visits were due to scooter injuries in August, September, and October?
- Which of the following shows the greatest percent of increase: the change in injuries from June to July or the change from August to September?
- About how much more did it cost to buy a ticket to Park A than a ticket to Park B in 1999?
- What was the percent of increase in the ticket prices at Park B from 1995 to 2000?
- To the nearest ten, how much more did it cost to buy a ticket to Park A in 2000 than in 1995?

B. Choose the **one best answer** to each question.

Questions 7 and 8 refer to the graph below.



7. Over what period of time did the price of goods actually decrease?

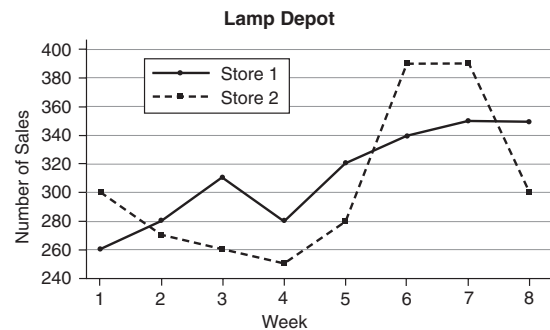
- 1930 to 1940
- 1940 to 1950
- 1960 to 1970
- 1970 to 1980
- 1990 to 2000

8. Goods purchased in 1970 were about what fraction of their cost in the year 2000?

- $\frac{4}{5}$
- $\frac{1}{2}$
- $\frac{1}{3}$
- $\frac{1}{5}$
- $\frac{1}{20}$

Questions 9 and 10 refer to the graph below.

Lamp Depot has two stores. The graph shows the sales data from the two stores for an 8-week period.



9. About how many more sales were there at Store 2 than at Store 1 in week 6?

- 110
- 50
- 40
- 25
- 20

10. During which week did Store 1 experience the greatest increase in sales from the week before?

- Week 2
- Week 3
- Week 4
- Week 5
- Week 6

**Answers and explanations begin on page 671.**

## DATA ANALYSIS

## Circle Graphs

**Key Ideas**

- In a circle graph, the circle represents a whole amount and the sections represent parts of the whole.
- Sections are usually labeled with percents, but they can show amounts.
- The size of each section of a circle graph is equal to the fraction or percent it represents.

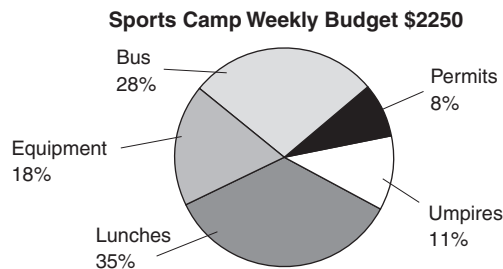
**GED TIP**

Since a circle graph represents a whole, or 100%, amounts can easily be converted to percents. For example, \$0.05 on a circle graph can also represent 5%.

**Working with Circle Graphs**

A **circle graph** is used to show how a whole amount is broken into parts. The sections of a circle graph are often labeled with percents. The size of each section corresponds to the fraction it represents. For example, a section labeled 25% is  $\frac{1}{4}$  of the circle.

**Example 1:** A graph below shows how a children's sports camp spends its weekly budget.

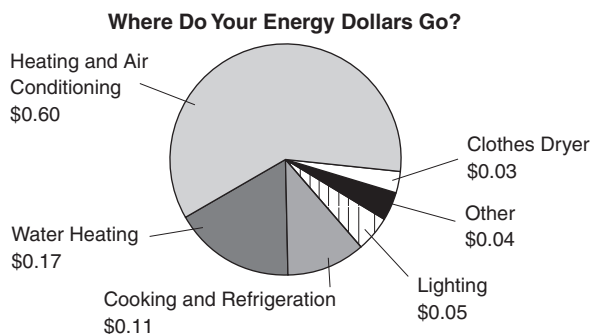


How much does the sports camp spend on lunches each week?

1. **Analyze the graph.** According to the heading, the entire circle represents the camp's weekly budget of \$2250. Find the section labeled "lunches." According to the section label, lunches make up 35% of the weekly budget.
2. **Use the data.** To find the amount spent on lunches, find 35% of \$2250.  
 $\$2250 \times 0.35 = \$787.50$

A circle graph may also be labeled using fractions or decimals. One common kind of circle graph labels each section in cents to show how a dollar is used.

**Example 2:** According to the graph, what percent of the average energy bill is spent on drying clothes, lighting, and heating water?



1. **Analyze the graph.** The entire circle represents \$1. The amounts in the sections mentioned in the problem are \$0.03, \$0.05, and \$0.17.
2. **Use the data.** Add the amounts:  $\$0.03 + \$0.05 + \$0.17 = \$0.25$ . Since \$0.25 is 25% of a dollar, then 25% of an average bill is spent on these items.

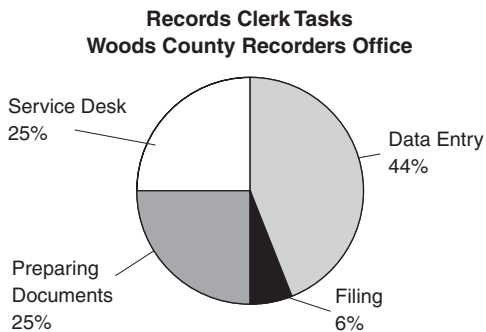
## DATA ANALYSIS ► PRACTICE 3

A. For questions 1 through 3, use the sports camp budget on page 418. For questions 4 through 6, use the circle graph on energy on page 418.

1. What percent of the total sports camp budget is spent on equipment and umpires?
2. What fraction of the sports camp budget is spent on permits?
3. What amount does the camp spend each week on busing?
4. A family's energy bill is \$180. According to the graph, how much did the family spend on water heating?
5. Which section is greater than 50% of an energy dollar?
6. Which energy cost is about  $\frac{1}{10}$  of the energy dollar?

B. Choose the one best answer to each question.

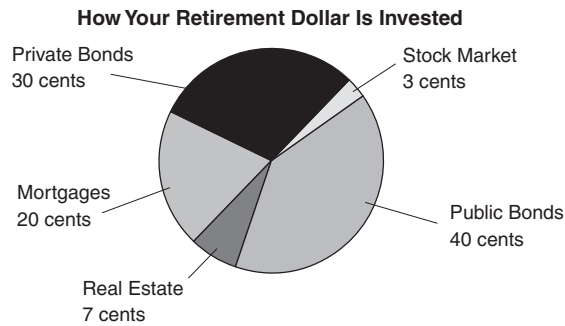
Questions 7 and 8 refer to the following graph.



7. During a 40-hour workweek, how many hours does a records clerk spend preparing documents?
  - (1) 10
  - (2) 15
  - (3) 25
  - (4) 30
  - (5) Not enough information is given.
8. What percent of a records clerk's time is spent on tasks other than data entry?
  - (1) 9%
  - (2) 25%
  - (3) 28%
  - (4) 44%
  - (5) 56%

Questions 9 and 10 refer to the following graph.

The employees of National Bank are given the following graph to explain how their retirement fund is invested.



9. What percent of each retirement dollar is invested in real estate and the stock market?
  - (1) 4%
  - (2) 10%
  - (3) 40%
  - (4) 90%
  - (5) 100%
10. Steve contributes \$120 of each paycheck to his National Bank retirement fund. How much of his contribution is invested in public bonds?
  - (1) \$36
  - (2) \$40
  - (3) \$48
  - (4) \$84
  - (5) Not enough information is given.

Answers and explanations begin on page 671.

## DATA ANALYSIS

## Frequency and Central Tendency

**Key Ideas**

- A frequency table is used to show how often data occurs.
- Tally marks are made next to a list to record the data.
- Numerical data is often grouped in intervals.

**GED TIP**

*If several problems refer to a frequency table, you may want to count the tally marks for each line and record the numbers on scratch paper. Then use the numbers to solve all related problems.*

**Using a Frequency Table**

A **frequency table** shows how often an item appears in a data set. The data is in the form of tally marks next to a list of items.

**Example 1:** The sales manager at Montana Motors asked her sales staff to keep a record of the color of the cars that were chosen for test-drives in one month. Then she combined the data to make the frequency table shown below.

Montana Motors—Car Color Preferences	
white	
black	
red	
green	
silver	
other	

What was the ratio of black cars driven to silver cars driven?

1. Count the tally marks. There are 27 marks for black and 9 for silver.
2. Write the ratio and reduce to lowest terms.  $\frac{27}{9} = \frac{3}{1}$

The ratio of black to silver is **3 to 1**. You can also say that the black cars are 3 times more popular than the silver cars.

Numerical data is often grouped in intervals. The table below shows data grouped in intervals of 18 to 24, 25 to 40, and so on. This way of presenting data is called a **grouped frequency table**.

**Example 2:** The table below shows the ages of the customers at Louise's Diner for a three-day period. What percent of the customers were from 25 to 40 years old?

Louise's Diner Customers by Age Group, February 19–22	
under 18	
18–24	
25–40	
41–55	
over 55	

1. Find the data you need. There are 28 marks for the 25–40 age group. Add the tally marks for all age groups to find the total number of customers for the three-day period.  $6 + 18 + 28 + 10 + 8 = 70$
2. Find the percent. The base is 70, the total number of customers. The part is 28, the number of customers in the desired age group. Solve for the rate.  $\frac{28}{70} = \frac{4}{10} = 0.4 = 40\%$

## DATA ANALYSIS ► PRACTICE 4.1

A. For questions 1 through 3, use the frequency table from Montana Motors on page 420. For questions 4 through 6, use the frequency table from Louise’s Diner on page 420.

1. What was the total number of drivers who preferred white or black cars?
2. How many more drivers chose red than silver cars?
3. What was the ratio of red cars to white cars chosen for test-drives?
4. What is the ratio of customers under 18 to those over 55?
5. What was the total number of customers from 18 to 40 years of age?
6. What percent of the total customers were from 41 to 55 years of age? (Round your answer to the nearest whole percent.)

B. Choose the **one best answer** to each question.

Questions 7 and 8 refer to the following information.

The frequency table shows the reasons customers gave for returning clothing merchandise to a store.

Reason	Number
Wrong color	
Wrong size	
Unwanted gift	
Found flaw after purchase	
Changed mind	

7. What is the ratio of customers saying the clothes were the wrong size to all other reasons given?
  - (1)  $\frac{4}{15}$
  - (2)  $\frac{4}{11}$
  - (3)  $\frac{4}{9}$
  - (4)  $\frac{4}{5}$
  - (5) Not enough information is given.
8. What percent of the customers who returned clothing said that the clothes were an unwanted gift?
  - (1) 5%
  - (2) 20%
  - (3) 25%
  - (4)  $33\frac{1}{3}\%$
  - (5) 50%

Questions 9 and 10 refer to the following information.

A personnel office gives keyboarding tests to people applying for a job. The test shows how many words per minute (wpm) a job applicant can enter correctly. After testing 90 applicants, the manager made the following table.

Speed	Number of Applicants
Under 30 wpm	
30–45 wpm	
46–60 wpm	
Over 60 wpm	

9. What percent of the applicants had a speed of exactly 40 wpm?
  - (1) 14%
  - (2) 25%
  - (3) 28%
  - (4) 38%
  - (5) Not enough information is given.
10. What is the ratio of applicants who could keyboard at a speed above 45 wpm to those who could keyboard at a speed of 45 wpm or less?
  - (1) 1:3
  - (2) 1:2
  - (3) 2:3
  - (4) 3:2
  - (5) 6:5

Answers and explanations begin on page 671.



## Mean, Median, and Mode

Suppose you were asked how much money you usually spend on groceries in a week. Some weeks you may spend a great deal; other weeks, much less. You would probably choose an amount in the middle to represent what you typically spend. This middle value is called an **average**, or **measure of central tendency**.

The most common type of average is the **mean**, or the arithmetic average.

**Example 1:** In five football games, a team scored 14, 21, 3, 20, and 10 points. What is the mean, or average, score per game?

1. Add the values.  $14 + 21 + 3 + 20 + 10 = 68$
2. Divide by the number of items in the data set.  $68 \div 5 = \mathbf{13.6 \text{ points per game}}$

Although it is impossible for a football team to score 13.6 points in a game, the number represents the center of the scores from the five games.

A calculator is useful for finding the mean. Do the calculations in two steps. Enter the addition operations and press  $\boxed{=}$ . Then enter the division operation. Try Example 1 above with a calculator.

Another measure of average is the median. The **median** is the middle value in a set of data.

**Example 2:** During a 7-hour period, a bookstore recorded the following numbers of sales. Find the median number of sales.

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7
43	28	24	36	32	37	48

1. Arrange the values by size.  $24, 28, 32, 36, 37, 43, 48$
2. Find the middle number.  $24, 28, 32, \boxed{36}, 37, 43, 48$

If there is an even number of values, the median is the mean of the two middle values.

**Example 3:** Robert has the following test scores in his math class: 90, 72, 88, 94, 91, and 80. What is the median score?

1. Arrange the values by size and find the middle.  $72, 80, \boxed{88, 90}, 91, 94$
2. Find the mean of the two middle values. The median score is **89**.  
Add:  $88 + 90 = 178$   
Divide by 2:  $178 \div 2 = \mathbf{89}$

The **mode** is the value that occurs most often in a set of data. A set of data could have more than one mode if several items occur the same number of times. If each item of data occurs only once, there is no mode.

**Example 4:** Six weather stations recorded the following temperatures at 3 P.M.:  $45^\circ, 44^\circ, 45^\circ, 47^\circ, 46^\circ, \text{ and } 45^\circ$ . What is the mode of the data?

The temperature  $45^\circ$  occurs the most often (3 times). The mode is  **$45^\circ$** .

**Note:** In a set-up problem, the expression used to represent the mean will either be written with parentheses:  $(14 + 21 + 3 + 20 + 10) \div 5$  or as a fraction:

$$\frac{14 + 21 + 3 + 20 + 10}{5}$$

## DATA ANALYSIS ► PRACTICE 4.2

A. For each data set, find the mean, median, and mode. Round calculations to the nearest hundredth or cent. You **MAY** use a calculator.

- Golf scores for 18 holes:  
76, 82, 75, 87, 80, 82, and 79
- Sales totals for 6 weeks:  
\$5,624; \$10,380; \$8,102; \$6,494; \$12,008;  
and \$8,315
- Cost of lunch for 8 days:  
\$4.50, \$5.25, \$4.50, \$3.75, \$4.50, \$5.25,  
\$6.10, and \$4.25
- Miles driven per day for 5 days:  
330, 286, 342, 300, and 287
- Grocery bills for 4 weeks:  
\$97.48, \$106.13, \$110.98, and \$92.74
- Scores on 7 quizzes:  
90, 72, 86, 100, 88, 78, and 88
- High temperatures for 10 days:  
96°, 103°, 98°, 101°, 98°, 100°, 100°, 97°,  
98°, and 100°
- Inches of rainfall over 3-day period:  
2.5, 1.8, and 1.4
- Attendance figures at a play:  
305, 294, 328, 296, 305, 315, and 292
- Hours worked per week for 5 weeks:  
36, 40, 38, 40, and 40

B. Choose the **one best answer** to each question. You **MAY** use your calculator.

Questions 11 and 12 refer to the following information.

**Homes Sold in Fairfield Heights in June**

Home	Asking Price	Selling Price
#1	\$124,600	\$116,500
#2	\$132,400	\$124,800
#3	\$118,900	\$116,500
#4	\$98,500	\$103,600
#5	\$105,800	\$109,000
#6	\$122,400	\$118,400

- What was the mean asking price of the homes sold in Fairfield Heights in June?  
(1) \$120,650  
(2) \$117,100  
(3) \$116,500  
(4) \$115,450  
(5) \$114,800
- What was the median selling price of the homes sold in Fairfield Heights in June?  
(1) \$112,750  
(2) \$114,200  
(3) \$114,800  
(4) \$116,500  
(5) \$117,450
- The numbers of patients enrolled at four health clinics are 790, 1150, 662, and 805. Which expression could be used to find the mean number of patients per clinic?  
(1)  $\frac{790 + 1150 + 662 + 805}{4}$   
(2)  $790 + 1150 + 662 + 805$   
(3)  $\frac{662 + 1150}{2}$   
(4)  $\frac{790 + 805}{2}$   
(5)  $(790 + 1150 + 662 + 805) \div 2$
- What is the median value of \$268, \$1258, \$654, \$1258, \$900, \$1558, and \$852?  
(1) \$1258  
(2) \$960  
(3) \$900  
(4) \$913  
(5) \$852
- What is the mode of the following points scored: 14, 17, 14, 12, 13, 15, 22, and 11?  
(1) 13.5  
(2) 14  
(3) 14.75  
(4) 16.5  
(5) Not enough information is given.

Answers and explanations begin on page 672.

## DATA ANALYSIS

## Probability

**Key Ideas**

- Probability is a ratio. It can be expressed as a ratio, fraction, decimal, or percent.
- Theoretical probability is the ratio of favorable outcomes to possible outcomes.
- Experimental probability is the ratio of favorable outcomes to the number of trials in an experiment.

**GED TIP**

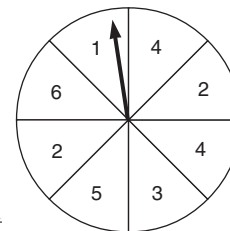
*In a GED probability problem, skim the answer choices to see if they are in fraction, percent, or ratio form. Knowing the answer form will help you decide how to do your calculation.*

**Simple Probability**

Probability tells whether something is likely or unlikely to happen. The probability of any event can be expressed by a number from 0 to 1. If an event has a 0 probability, the event is impossible. An event with a probability of 1 is certain to happen. Most events are somewhere in between.

To find the probability of a simple random event, we must identify favorable and possible outcomes. A **favorable outcome** is the event that we are interested in. The **possible outcomes** are all the possible events that could occur. **Theoretical probability** (sometimes called **simple probability**) is the ratio of favorable outcomes to possible outcomes.

**Example 1:** The spinner is divided into 8 equal sections. What is the probability of spinning a 4 on the spinner?



1. There are two sections labeled 4 on the spinner, and 8 sections in all.

2. Use the probability ratio:  $\frac{\text{favorable outcomes}}{\text{possible outcomes}} = \frac{2}{8} = \frac{1}{4}$

The probability of spinning a 4 on the spinner is **1 out of 4,  $\frac{1}{4}$ , 0.25, or 25%**.

In Example 1, probability was based on what we knew could happen. Another type of probability, called **experimental probability**, is based on what actually happens during the trials of an experiment. The number of trials are the number of times you try the experiment.

**Example 2:** Ricardo and Scott used the same spinner to play a game. They kept track of the numbers that they got on each spin for 20 spins. The numbers are shown below.

2, 4, 4, 6, 4, 3, 4, 6, 4, 3, 1, 6, 2, 2, 5, 2, 4, 2, 1, 2

Based on their results, what is the experimental probability of spinning a 4?

1. Ricardo and Scott spun a 4 six times out of twenty.

2. Use this ratio:  $\frac{\text{favorable outcomes}}{\text{number of trials in experiment}} = \frac{6}{20} = \frac{3}{10}$ , **0.3, or 30%**

Notice that experimental probability is close to, but not necessarily equal to, theoretical probability. Theoretical probability can tell you what will probably happen, but it can't predict what will actually happen.

## DATA ANALYSIS ► PRACTICE 5.1

Express probability as a fraction, decimal, and percent for questions 1 through 5. **Do not** use a calculator.

- A game has 50 wooden tiles. Players draw tiles to spell words. If 20 of the tiles are marked with vowels, what is the probability of drawing a vowel from the tiles?
- A spinner has five equal sections colored either red, white, or blue. After 40 spins, a player has the following results:
- There are four red, four blue, and two green marbles in a bag. If one marble is chosen from the bag, what is the probability that the marble will be green?
- A movie theater sells 180 adult tickets and 60 children's tickets to a movie. As part of a special promotion, one ticket will be chosen at random, and the winner will receive a prize. What is the probability that the winner will be a child?
- A spinner has six equal sections numbered from 1 to 6. What is the probability of spinning either a 5 or 6?

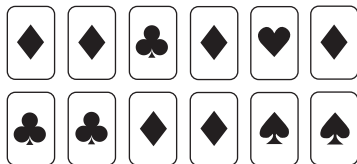
Color	Frequency
red	
white	
blue	

What is the probability of not spinning blue on the spinner?

### B. Choose the one best answer to each question. You MAY use your calculator.

Questions 6 and 7 refer to the following information.

A deck of twelve cards is marked with the following symbols.



- If a card is chosen at random, what is the probability of selecting a diamond ( $\diamond$ )?
  - 6%
  - 12%
  - 50%
  - 60%
  - 100%
- If a card is chosen at random, what is the probability of selecting something other than a club ( $\clubsuit$ )?
  - $\frac{3}{4}$
  - $\frac{2}{3}$
  - $\frac{1}{3}$
  - $\frac{9}{100}$
  - Not enough information is given.

Questions 8 and 9 refer to the following information.

Erin flipped a coin forty times and made this table to show how many outcomes were "heads" and how many were "tails."

heads	
tails	

- Based on Erin's data, what is the experimental probability of getting tails on a coin flip?
  - 3 out of 5
  - 3 out of 4
  - 2 out of 3
  - 2 out of 5
  - 1 out of 2
- What is the theoretical probability of getting heads on a coin flip?
  - 3 out of 5
  - 3 out of 4
  - 2 out of 3
  - 2 out of 5
  - 1 out of 2

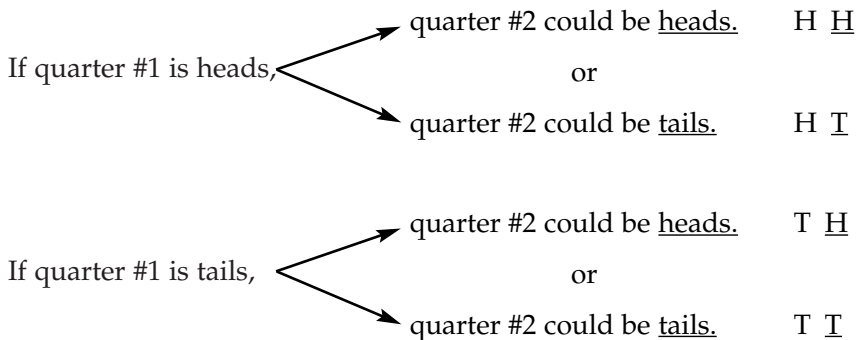
Answers and explanations begin on page 672.

## Dependent and Independent Probability

You know how to find the probability of a single event. You can use this knowledge to find the probability of two or more events.

**Example 1:** Brad tosses two quarters into the air. What is the probability that both will land so that the heads' sides are showing?

One way to solve the problem is to list or diagram all the possible outcomes.



There are four possible outcomes, and only one is favorable (HH). Therefore, the probability of having both land with the heads side up is  $\frac{1}{4}$ , or 25%.

You can also use multiplication to find the probability.

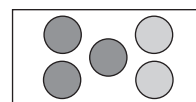
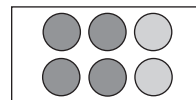
- Find the probability of the individual events. The probability that one coin will be heads is  $\frac{1}{2}$ , and the probability that the other will be heads is  $\frac{1}{2}$ .
- Multiply to find the probability of both events.  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

The two coin tosses in Example 1 are **independent events**. When events are independent, one does not affect the probability of another. In Example 2 below, the events are **dependent**. Once the first event takes place, the probability of the second event is changed.

**Example 2:** A box contains four blue marbles and two red marbles. If you select two marbles, what is the probability that both will be blue?

(*Hint:* Even though the marbles in the box are taken out at the same time, think of one as the first marble and the other as the second marble.)

- There are six marbles in the box, and four are blue. The probability that the first marble will be blue is  $\frac{4}{6}$ , which reduces to  $\frac{2}{3}$ .
- Assume the first marble selected is blue. Now there are only five marbles in the box, and three are blue. The probability that the second marble will be blue is  $\frac{3}{5}$ .
- Multiply to find the probability of the two events.  $\frac{2}{3} \times \frac{3}{5} = \frac{6}{15}$ , or  $\frac{2}{5}$



The probability that both marbles will be blue is **2 out of 5**.

*Note:* The events in Example 2 would not be dependent if the first marble were replaced before the second marble was selected. Always think carefully about the situation to decide whether two events are dependent or independent.

**Note:** Many probability problems involve randomly choosing two items from a group. A situation is dependent if the first item is not returned to the group before the second item is chosen.

## DATA ANALYSIS ► PRACTICE 5.2

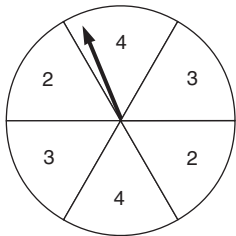
Solve as directed. Express answers as fractions.

- Kim rolls two standard six-sided dice. What is the chance that both will be 4s?
- Ten cards are numbered from one to ten. Toni draws out a card, replaces it, and then draws another card. What is the probability that both cards will be numbers greater than 5?
- A spinner has four equal sections. Two sections are red, one is green, and one is blue. If the spinner is spun three times, what is the probability that all three spins will be red?
- Twenty marbles are placed in a bag. Ten are red, and ten are black. One marble is drawn from the bag and set aside. Another marble is drawn from the bag. What is the chance that both marbles will be red?
- Allison tosses a coin four times. What is the chance that the coin will be heads all four times?
- If you roll two standard dice, what is the probability that both will be an odd number?

**B. Choose the one best answer to each question. You MAY use your calculator.**

Questions 7 and 8 refer to the following information.

In a game a player rolls a die, numbered from 1 to 6, and spins a spinner. The spinner is shown below.



- What is the probability of rolling a 5 and then spinning an even number?
    - $\frac{1}{9}$
    - $\frac{1}{6}$
    - $\frac{5}{12}$
    - $\frac{2}{3}$
    - $\frac{5}{6}$
  - What is the chance that a player will get the same number on both the die and the spinner?
    - $\frac{5}{6}$
    - $\frac{2}{3}$
    - $\frac{1}{3}$
    - $\frac{1}{6}$
    - Not enough information is given.
- Daniel uses the ten cards below in a magic trick.
- 
- Two rows of five cards each. The top row contains four squares and one circle. The bottom row contains one circle and four squares.
- Daniel shuffles the cards and asks an audience member to choose and hold two cards. If the cards are chosen randomly, what is the chance that both will be marked with a square?
    - 11 out of 19
    - 8 out of 14
    - 3 out of 5
    - 1 out of 3
    - 1 out of 5
  - There are fifteen colored chips in a bag. Eight are green, and seven are white. Five white chips are removed. What is the probability that the next chip selected will be green?
    - 100%
    - 80%
    - 75%
    - 53%
    - 25%

**Answers and explanations begin on page 672.**

## DATA ANALYSIS

## Problem Solving

**Key Ideas**

- An item set has two or more questions based on the same data.
- Read the data carefully to make sure you understand how it is organized.
- Find the facts you need quickly, and ignore any unnecessary information.

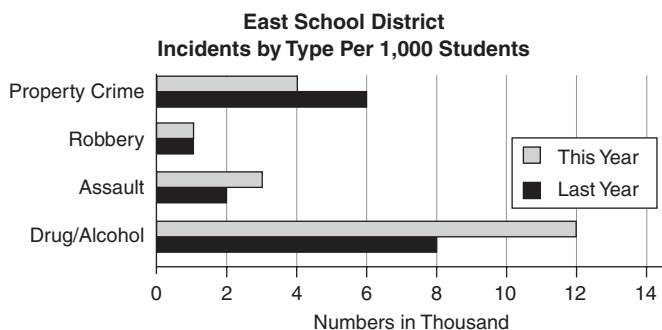
**ON THE GED**

About  $\frac{1}{4}$  of the questions on the GED Math Test will be part of an item set.

**Working with Item Sets**

An **item set** is a group of GED problems based on the same information. The information may be organized in a paragraph, a chart or table, a graph, or a diagram. To do well on an item set, read the information carefully, then work each problem. Use only the facts you need for each problem, and ignore the rest.

**Example:** Questions 1 and 2 refer to the following graph:



1. If East School District has about 32,000 students, how many assault incidents occurred last year?
  - (1) 2
  - (2) 3
  - (3) 64
  - (4) 96
  - (5) 2,000
2. Which of the following shows the percent of change in property crimes from last year to this year?
  - (1)  $66\frac{2}{3}$  increase
  - (2) 50% increase
  - (3) 50% decrease
  - (4)  $33\frac{1}{3}$ % increase
  - (5)  $33\frac{1}{3}$ % decrease

As you study the graph, note that the upper bar in each set represents this year's data, and the lower bar represents last year's. Also, notice that the scale at the bottom of the graph shows the number of incidents *per 1,000 students*.

To answer question 1, read the lower bar next to assault incidents. There were 2 incidents per 1,000 students. There are 32,000 students in the district. Use proportion to solve the problem.  $\frac{2}{1000} = \frac{x}{32,000}$ ;  $2 \times 32,000 \div 1,000 = 64$

The answer to question 1 is **(3) 64**.

To answer question 2, you need to compare the two bars for property crimes. The upper bar (this year's data) is shorter than the lower bar (last year's data). Therefore, there has been a decrease in property crimes. Now find the percent of decrease. Subtract.  $6 - 4 = 2$  Divide by the original (last year's) number.  $\frac{2}{6} = \frac{1}{3} = 33\frac{1}{3}\%$  The correct answer is (5)  $33\frac{1}{3}\%$  decrease.

Although the questions in an item set relate to the same data, you will never need the answer from one question to solve another. If you are having trouble with the first question in an item set, go on to the next question. Then come back to the other question later.

## DATA ANALYSIS ► PRACTICE 6

Choose the one best answer to each question. You MAY use your calculator for questions 1 and 2.

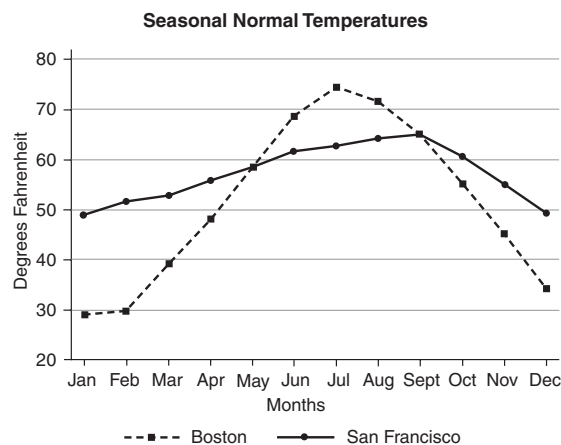
Questions 1 and 2 refer to the following information.

The city animal shelter surveyed 573 people who own either a dog or a cat to find out where they obtained their pet.

Source	Number of Pet Owners
Breeder	142
Animal shelter	160
Pet store	77
Friend	84
Adopted stray	110

- What is the ratio of pet owners who adopted a stray to those who bought their dog or cat at a pet store?
  - $\frac{7}{11}$
  - $\frac{7}{10}$
  - $\frac{10}{7}$
  - $\frac{11}{7}$
  - $\frac{17}{7}$
- To the nearest whole percent, what percent of the pet owners surveyed got their pet from either a friend or an animal shelter?
  - 15%
  - 28%
  - 43%
  - 72%
  - 85%

Questions 3 and 4 refer to the following graph.



- During which month is it about 20° colder in Boston than it is in San Francisco?
  - January
  - April
  - July
  - September
  - November
- In May, what is the approximate normal temperature for both Boston and San Francisco?
  - 42°
  - 46°
  - 58°
  - 65°
  - 72°

Answers and explanations begin on page 672.



## Key Ideas

- Each paragraph should have one main idea. Each sentence in the paragraph should relate to the main idea.
- Break long paragraphs into two if possible.
- Join short paragraphs if they both relate to the same main idea.

### GED TIP

If a paragraph is especially long in a GED passage, check to see if the main idea shifts at some point. If so, that is where the paragraph should be divided in two.

## CLEAR AND ORGANIZED WRITING

# Ideas and Paragraphs

### Effective Paragraphs

A **paragraph** is a group of sentences that relate to one main idea. If the sentences do not help develop the same main idea, the paragraph seems disorganized, and the writer's meaning is unclear.

**Incorrect:** Group of sentences that do not relate to the same main idea:

Houseplants make a home more beautiful, but many people find them difficult to take care of. I water my houseplants once a week. There are many different kinds of houseplants. If you are buying a houseplant as a gift, consider how much light the person's home gets.

In the example above, each sentence is about houseplants, but there is no main idea. In the paragraph below, however, each sentence supports one idea: *helping houseplants adjust to a new home.*

**Correct:** Paragraph with sentences that relate to one main idea:

Houseplants need help to adjust to a new environment. Your home is probably less bright and humid than a greenhouse or plant store. Therefore, when you get a new houseplant, keep it near a south-facing window at first. Move it away from the light over a period of four weeks. Use a humidifier to make the air in your home more humid. These actions will help avoid the loss of foliage that often occurs when plants change locales.

One paragraph should stop and a new one begin when the main idea shifts. In the example below, the first four sentences describe what road rage is, while the last four sentences tell how to react to road rage. The writer should have started a new paragraph with sentence 5.

**Incorrect:** One paragraph that should be divided into two paragraphs:

(1) Road rage is an episode of violent behavior that takes place when one driver's actions anger another driver. (2) Young males are the most likely to lose their cool on the road. (3) Most road rage incidents take place during rush hour, when people often get frustrated. (4) Warm weather is another factor in road rage. (5) If you're a victim of an aggressive driver, try to stay calm. (6) Don't react or make eye contact. (7) Try not to brake or swerve in retaliation. (8) These actions will only infuriate the other driver, and you might lose control of your car.

Sometimes the ideas in two paragraphs really belong in one:

**Incorrect:** Two paragraphs that should be combined:

To make chicken broth, boil a pot of water. Take some chicken, onions, parsnips, carrots, and herbs, and wrap them up in cheesecloth.

Make sure it is real cotton cheesecloth, or you won't be able to eat the broth! Simmer the cheesecloth-wrapped vegetables and chicken in the water for several hours; then remove them. Add salt and pepper to taste.

---

## CLEAR AND ORGANIZED WRITING ► PRACTICE 1.1

**A. Directions:** Read each group of sentences. If there is a main idea, underline it. If there is no main idea, write “No MI.”

- \_\_\_ 1. The pharmacist at the local drugstore is very helpful. She can always get the medicines we need. She arranges deliveries of our prescriptions when we’re sick. When we don’t have money, she lets us pay the next time. Many people have written to thank her.
- \_\_\_ 2. Keep your toolbox well equipped, and you’ll always be able to make home repairs. Common home repairs include replacing lighting fixtures and fixing furniture. The community center offers a class on this subject. You can pay someone to do home repairs.
- \_\_\_ 3. Some people don’t vote because they think their vote doesn’t count. However, elections have been won by just a few hundred votes. If people don’t vote, they are giving up their voice. Every vote counts, so let your voice be heard and vote!
- \_\_\_ 4. When you are traveling, it’s a good idea to mark your luggage clearly. Put a luggage tag on every piece you intend to bring, including hand luggage like backpacks. To recognize your luggage quickly, put a brightly colored ribbon on it.
- \_\_\_ 5. Listening to music can benefit you in many ways. When you are feeling stress, music can help soothe and relax you. When you need energy, rock ‘n’ roll or hip-hop can give you a boost. If you have a baby or small child, soft music can help lull the child to sleep.

**B. Questions 6 and 7 refer to the following paragraphs.**

### The Common Cold

#### (A)

(1) How frequently you get colds depends on your age. (2) The average young adult gets two to four colds a year. (3) Adults over 60 have fewer than one cold a year, while children have six to ten colds annually. (4) Colds are caused by viruses. (5) Contrary to popular belief, being cold will not cause you to get a cold. (6) Vitamin C is thought to prevent colds, but there is no proof.

#### (B)

(7) Because there is no cure for the common cold, prevention is key. (8) Washing your hands is the best way to avoid getting a cold. (9) Encourage others who have colds to sneeze into a tissue and throw it away immediately.

#### (C)

(10) Refrain from touching your eyes and nose, and stay far from people who have colds.

6. Which revision would improve the effectiveness of the article?

Begin a new paragraph with

- (1) sentence 2
- (2) sentence 3
- (3) sentence 4
- (4) sentence 5
- (5) sentence 6

7. Which revision would improve the effectiveness of the article?

- (1) remove paragraph B
- (2) remove paragraph C
- (3) move paragraph B to follow paragraph C
- (4) join paragraphs B and C
- (5) no revision is necessary

**Answers and explanations start on page 629.**

## Key Ideas

- A topic sentence states the main idea of a paragraph.
- Each sentence in a paragraph should provide details to support the main idea.
- An essay should have a main idea statement that states the main point of the entire essay.

### ON THE GED

*The topic sentence will generally be at the beginning of a paragraph. You may need to choose a more effective topic sentence, or you may need to choose a topic sentence for a paragraph that is missing one.*

## Topic Sentences in Paragraphs

Every paragraph should have a **topic sentence** that states the main idea. The other sentences in the paragraph are **supporting details**. These details tell more about the topic sentence. The topic sentence usually appears at the beginning of the paragraph, though it may appear elsewhere.

A topic sentence must do two things:

- Tell the topic, or subject, of the paragraph
- State the central point that the writer wants to make about the topic

In the paragraph below, the topic sentence is underlined. Notice how the topic sentence tells the subject of the paragraph (*graffiti in the neighborhood*) and states the central point about the topic (*graffiti is a serious problem in the neighborhood and should be addressed*).

### EXAMPLE

We need to do more to stop the problem of graffiti in our neighborhood. Recently, several bus stops and the exterior walls of many buildings have been defaced with unsightly graffiti. The neighborhood is fast becoming a much less desirable place to live. As a result, prospective renters feel frightened and look elsewhere.

A topic sentence should not be too specific or too general. If it is, readers won't know what the overall point is. A topic sentence like "The market is covered with gang symbols" would be too specific for the paragraph above. "There is graffiti in our neighborhood" would be too general.

## Main Idea Statements in Essays

Just as every paragraph should have a topic sentence, so every essay should have a **main idea statement**. Whereas a topic sentence states the main idea, or "point," of a single paragraph, a main idea statement expresses the central point of all the paragraphs in an essay. In the essay below, the main idea statement is underlined. Notice that while the main idea statement appears in the first paragraph, it is not the first sentence.

### EXAMPLE

While graffiti is indeed a serious problem facing our neighborhood, other issues also need to be addressed. Two of the most pressing neighborhood issues are the crime rate and the lack of decent housing.

In recent months, crime has increased. For example, a number of muggings have occurred. As a result, residents are nervous about going out at night. The number of apartment break-ins has increased as well. We need a stronger police presence to combat the crime problem.

In addition, much of the housing in this neighborhood is in poor condition. Every day, residents are put in danger by peeling paint, broken locks, and rundown fences. We must put pressure on landlords to resolve their tenants' complaints, perhaps by showing them that, in the long run, it is in their financial interest to do so.

If we do not act immediately, our neighborhood will decline even more. Therefore, I recommend that we form a community task force to tackle these issues. We should ask our city councilwoman to be an advocate for us. With full participation of community members, we will be on our way to a safer, more livable neighborhood.

---

## CLEAR AND ORGANIZED WRITING ► PRACTICE 1.2

A. **Directions:** Write topic sentences for each of the following paragraphs.

1. \_\_\_\_\_

Weather satellites send us information about weather around the world. Thanks to satellite TV, we have an ever-widening range of programs to choose from. Satellites even play a role in long-distance telephone communication.

2. \_\_\_\_\_

First of all, stock prices are falling. Second, home sales have slowed to a crawl. Finally, many consumers have cut back on big purchases such as cars, home improvements, and vacations.

3. \_\_\_\_\_

According to the new dress code, employees of the library may now wear “semi-casual” clothing. Khakis, blue jeans with no holes, and other slacks are acceptable for men and women. Skirts must be knee-length or longer. Sandals are acceptable in the summer. Employees are requested not to wear gym shoes.

B. Questions 4 and 5 refer to the following paragraphs.

### Repetitive Strain Injury

(A)

(1) Repetitive strain injury is a problem. (2) The injury can affect factory workers, computer users, and meatpackers, among others. (3) Anyone who uses his or her hands all day may be affected, even if the work does not seem to require a lot of physical effort. (4) When fine hand movements are repeated for many hours a day, they eventually strain the forearms, wrists, and fingers.

(B)

(5) Maintaining a stiff and constrained posture, as is required for working at a computer, places a lot of stress on the body. (6) Likewise, holding muscles still for long periods causes fatigue and discomfort. (7) In addition, many jobs require workers to work at top speed all day long. (8) Consistently working quickly deprives the body of natural rest breaks, forcing workers to push themselves to the limit.

4. Which is the most effective rewrite of sentence 1?

- (1) Some workers get repetitive strain injury.
- (2) Just what, you may ask, is repetitive strain injury?
- (3) Repetitive strain injury affects many workers.
- (4) Workers suffer many injuries on the job, and repetitive strain injury is just one of them.
- (5) Repetitive strain injury is a painful condition resulting from repeated use of the hands.

5. Which sentence would be most effective if inserted at the beginning of paragraph B?

- (1) Repetitive movements cause muscle strain.
- (2) A number of factors contribute to repetitive strain injury.
- (3) Watch your posture as you work.
- (4) Repetitive strain injury is very common.
- (5) Computer users frequently have problems.

Answers and explanations start on page 629.

### Key Ideas

- The sentences in a paragraph should follow a logical order.
- Keep reasons and examples close to the point you are making with them.
- Eliminate any irrelevant details.

### ON THE GED

*Some items will test your ability to recognize the logical order and relevance of sentences in paragraphs. You also need this skill to write your essay.*

## CLEAR AND ORGANIZED WRITING

### Logical Order and Relevance

When you are writing a paragraph, it is important to put your sentences in a logical order. For instance, you may choose to sequence supporting details from most important to least important, from least important to most important, or in time order. All the sentences in the paragraph should follow the same order. If not, your readers may get confused. Look at the sample paragraphs below:

**Incorrect:** Sentences not in time order:

To clear a clogged drain using a plunger, fill the sink so that the water covers the plunger cup. Put petroleum jelly on the rim of the cup to form a tight seal. Before you begin, check to make sure that the plunger's suction cup is big enough to cover the drain. Block the sink overflow with rags. Plunge 15 or 20 times.

**Correct:** Sentences in time order:

To clear a clogged drain using a plunger, first check to make sure that the plunger's suction cup is big enough to cover the drain. Fill the sink so that the water covers the plunger cup. Put petroleum jelly on the rim of the cup to form a tight seal. Block the sink overflow with rags. Plunge 15 or 20 times.

The reasons and examples you use to support your points should come immediately after you make each point. If they come later, they will be less effective.

**Incorrect:** Reason far from point:

Don't make a habit of using chemicals to clear your drain. Always wear rubber gloves to protect your hands when using chemical drain cleaners. These powerful cleaners can damage the pipes.

**Correct:** Reason close to point:

Don't make a habit of using chemicals to clear your drain. These powerful cleaners can damage the pipes. Always wear rubber gloves to protect your hands when using chemical drain cleaners.

Sometimes a sentence in a paragraph relates to the topic in a general way but does not support the topic sentence. This mistake is a type of **irrelevant detail**, as shown in the paragraph below:

In many cultures, blonde is considered a desirable hair color. Perhaps blonde hair is valued because few people are naturally blonde. The practice of bleaching one's hair blonde is very old, dating back to ancient Roman times, and it continues to be popular today. My sister dyed her hair last year. A number of hair-bleaching products are sold in drugstores and supermarkets.

The sentence "My sister dyed her hair last year" is an irrelevant detail. While it relates to the topic of bleaching one's hair, it does not support the idea that blonde is a popular hair color in many cultures. This sentence should be deleted.

## CLEAR AND ORGANIZED WRITING ► PRACTICE 2

**A. Directions:** Cross out the irrelevant detail in each paragraph.

1. Why do people blame themselves when things go terribly wrong? Some psychologists believe that by blaming themselves, people find a reason for the upsetting event. Getting very ill is one bad thing that could happen. Finding a reason is more comforting than believing that the event took place for no reason at all.
2. It's almost time for the back-to-school rush. This year, come to Carter's to make sure that your child is outfitted with all the things that he or she needs. We have school supplies at rock-bottom prices. Adult students also can use school supplies. Check out our backpacks and lunch boxes in colors your kids will love. At Carter's, we have everything your kids will ever need!
3. Tenants: On Friday, April 23, the boiler in this building will be fixed. This job will be extremely expensive! There will be no water from 8 A.M. to 5 P.M. Please plan in advance, and draw out water the night before to be used the next day. We apologize for the inconvenience.

**B. Questions 4 through 6 refer to the following cover letter.**

(A)

Dear Mr. Soros:

(1) Thank you very much for taking the time to speak with me on Thursday. (2) It was a pleasure to meet you and to learn about your organization.

(B)

(3) As you will see from the enclosed resume, I recently completed a program in carpentry at Dade Community College. (4) I have also worked in the field. (5) In addition, I held a secretarial job.

(C)

(6) With my education and experience, I believe that I could make a valuable contribution to your company. (7) Thank you for considering me for this position. (8) I look forward to hearing from you soon. (9) I would be honored to take the job if it were offered to me.

Sincerely,

Sandra Barnes

4. Which revision would improve the effectiveness of paragraph A?

- (1) remove sentence 1
- (2) move sentence 1 to follow sentence 2
- (3) move sentence 2 to the beginning of paragraph B
- (4) move paragraph A to follow paragraph C
- (5) no revision is necessary

5. **Sentence 5:** In addition, I held a secretarial job.

Which revision should be made to the placement of sentence 5?

- (1) move sentence 5 to follow sentence 1
- (2) move sentence 5 to follow sentence 3
- (3) move sentence 5 to follow sentence 7
- (4) remove sentence 5
- (5) no revision is necessary

6. **Sentence 9:** I would be honored to take the job if it were offered to me.

Which revision should be made to the placement of sentence 9?

- (1) move sentence 9 to follow sentence 2
- (2) move sentence 9 to follow sentence 3
- (3) move sentence 9 to follow sentence 6
- (4) move sentence 9 to follow sentence 7
- (5) no revision is necessary

**Answers and explanations start on page 629.**



## CLEAR AND ORGANIZED WRITING

## Relating Sentences and Paragraphs

**Key Ideas**

- Use transitions to help your writing flow from sentence to sentence and from paragraph to paragraph.
- Choose the transition that expresses the correct relationship between ideas.

Good writing flows smoothly and logically from one sentence to the next and from one paragraph to the next. To make your writing flow, use **transitions** to show how ideas are related. Here are some common transitions and their uses.

Transitional Word or Phrase	Use it to . . .
for example, for instance	give an example
also, furthermore, in addition, in the same way, likewise, moreover, similarly	compare ideas or add to an idea
however, nevertheless, on the other hand, in contrast	contrast ideas
first, second, then, next, after that, later, at last, finally, in conclusion	show steps in a process or time order
because	show a cause
as a result, consequently	show a result
therefore, thus	draw a conclusion

You can link two sentences using transitions in the following ways:

**EXAMPLES**

**Begin the second sentence with a transition followed by a comma:** Raquel has many hobbies. For example, she paints furniture and sews clothes.

**Put the transition within the second sentence and set it off with commas:** Raquel has many hobbies. She paints furniture, for example, and sews clothes.

**Combine the two sentences into one. Put a semicolon before the transition and a comma after it:** Raquel has many hobbies; for example, she paints furniture and sews clothes.

Transitions can also be used to link one paragraph to another, highlighting the relationship between the two paragraphs.

**EXAMPLE**

Top performance in sports depends on “mental economy.” Mental economy involves focusing the mind on the task at hand. When athletes think too much about what they’re doing or worry about the outcome, they interfere with the communication between the brain and the muscles.

In addition, athletes must strive for “physical economy.” Although athletes put forth a tremendous amount of effort, they must take care to pace themselves in order to conserve energy for the end of the event.

To decide which transition to use, see how the paragraph is organized and what you are trying to accomplish. For example, are you comparing two things? If so, you will want to use transitions that compare ideas. Similarly, when choosing transitions to introduce paragraphs, consider the organization of the entire essay.

**GED TIP**

*When you use a transition at the beginning of a sentence, be sure you put a comma after the transition. One exception is the word then. You generally do not need a comma after it.*

## CLEAR AND ORGANIZED WRITING ► PRACTICE 3

A. **Directions:** Rewrite each pair of sentences using a transition from the chart on page 72. Change the punctuation if necessary. Write your answers on a separate sheet of paper.

**Example:** We have worked very hard this year. Sales are at an all-time high.  
*We have worked very hard this year. As a result, sales are at an all-time high.*

1. Our marketing efforts need to be enhanced. We will soon begin another marketing initiative.
2. Sales representatives say their jobs are extremely demanding. The salary is attractive.
3. The marketing director has instructed sales representatives to try some new ideas. Sales representatives can give away free samples.
4. A new ad campaign will be launched in just a few weeks. We expect sales to increase.

B. **Questions 5 through 7 refer to the following paragraphs.**

### Library Cafes

#### (A)

(1) Until very recently, eating was not something that most people associated with libraries. (2) A patron would likely be chased out for munching on a sandwich in a corner. (3) Times are changing, and these days patrons can even buy coffee and a croissant in some public libraries.

#### (B)

(4) Following the lead of successful bookstores, libraries across the country are installing cafes. (5) Some library cafes have menus that offer just as much variety as a regular restaurant. (6) In addition, one of them offers 20 varieties of coffee, hot cider, and muffins. (7) These refreshments make going to the library more pleasant and may therefore increase library patronage.

#### (C)

(8) Having a cafe may benefit a library financially. (9) The income from the cafe adds to library revenues. (10) Also, as more people enjoy coming to the library, they may be more likely to approve tax increases for it.

5. **Sentence 3:** Times are changing, and these days patrons can even buy coffee and a croissant in some public libraries.

Which correction should be made to sentence 3?

- (1) insert however after Times
- (2) insert however, after the comma
- (3) insert , however after these days
- (4) insert however after coffee
- (5) insert , however after coffee

6. **Sentences 5 and 6:** Some library cafes have menus that offer just as much variety as a regular restaurant. In addition, one of them offers 20 varieties of coffee, hot cider, and muffins.

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) restaurant. In addition,
- (2) restaurant, in addition,
- (3) restaurant, for example,
- (4) restaurant. For example,
- (5) restaurant. Nevertheless,

7. **Sentence 8:** Having a cafe may benefit a library financially.

The most effective revision of sentence 8 would begin with which group of words?

- (1) In addition, having
- (2) On the other hand, having
- (3) A cafe, by benefiting a library,
- (4) A library, however,
- (5) Financially a cafe

Answers and explanations start on page 629.



## Key Ideas

- List or brainstorm to generate ideas about the essay topic. Listing is a careful process, whereas brainstorming is a freer method that helps if you are having trouble generating ideas.
- Decide on a main idea for your essay.
- Cross out ideas that don't fit your main idea.

### GED TIP

Generally brainstorming is a timed activity. However, because the GED essay is timed, you also need to time yourself if you list ideas. Allow yourself about 5 minutes to generate ideas for your essay.

## CLEAR AND ORGANIZED WRITING

# Essay Writing Process: Prewriting

### Generating Ideas

When you first read an essay topic, you might feel that you have nothing to say about it. Fortunately, there are steps to help you get your ideas flowing. For example, read the essay topic below.

#### TOPIC

Is it important to develop a network of acquaintances, or is it better to concentrate on just a few close friends?

To get ideas to write about this topic, you could try one of these techniques:

- **Listing:** Think carefully about the topic; then list ideas that come to mind. You may even find yourself creating two or more lists of related ideas. As you list, try to stay on topic as you go. Later, you may decide that an idea is irrelevant. However, listing is a careful, thoughtful process that generally results in usable ideas.
- **Brainstorming:** Think about the topic and write down everything that comes to mind. Write as quickly as possible. Include all ideas. The process of brainstorming is especially helpful if you're experiencing "writer's block." Brainstorming results in a long list of ideas, but you must then evaluate which ideas are useful and which are not.

### Listing Ideas

#### Acquaintances:

good to have some—for variety  
need "quantity" sometimes—can't have a party with only two best friends  
close friends not always free to see you

#### Friends:

can tell anything to close friends  
can be yourself with friends  
best friends

### Brainstorming Ideas

everyone has friends and acquaintances  
acquaintances—help you network, get jobs  
can become real friends  
close friends always there for you  
my family always there for me  
fun to know lots of different people  
learn about world through acquaintances  
people today—no genuine closeness  
intimate conversation most satisfying

can confide in close friends  
some people can't be trusted  
friends' intentions sincere  
friends stand test of time  
understand when you're grouchy  
need more than 2 best friends for party  
can't be close friends with boss  
can't see close friends every day  
can be yourself with close friends

Once you have ideas on paper, your next step is to find your main idea. Look at your ideas, and see what main point most of them lead to. Here is the main idea of the listed ideas and the brainstormed ideas shown above:

**Main Idea:** A person needs both friends and acquaintances.

Once you write your main idea, go back to your generated ideas and cross off any that do not directly support it. For example, in the brainstormed list of ideas, "can't be close friends with boss" concerns friendship, but it isn't directly related to the main idea. It should be crossed out.

---

## CLEAR AND ORGANIZED WRITING ► PRACTICE 4.1

A. **Directions:** Use listing to generate ideas and find a main idea for each of the following topics.

**TOPIC 1**

In modern society, people depend on machines for many basic needs. Some believe that our dependence on machines undermines our natural abilities. Do you agree or disagree?

List here:

Main Idea: \_\_\_\_\_

**TOPIC 2**

What causes people to overeat?

List here:

Main Idea: \_\_\_\_\_

B. **Directions:** On a separate sheet of paper, brainstorm ideas about the following topic. Try to brainstorm in five minutes, but give yourself more time if needed. Then write your main idea, and cross out irrelevant ideas.

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Save your work. You will use this list in the next step of the writing process, grouping and ordering your ideas.

Answers and explanations start on page 629.

## Key Ideas

- Group and label your ideas.
- Organize your groups by outlining or mapping.
- Put your groups in an order that makes sense and supports the essay's main idea.

## Grouping Your Ideas

After you generate ideas and eliminate irrelevant ones, group related ideas together and label each group. Each group will become a paragraph in your essay. The label will become a topic sentence. For example, look at the brainstormed list on page 74. Those ideas could become two main groups labeled *benefits of close friends* and *reasons to have acquaintances*.

Another way to group ideas is to outline them. An **outline** shows each main group label marked by a roman numeral, followed by the supporting ideas in that group marked by capital letters. Minor details are marked by numbers. In the outline below, notice that the writer divided *reasons to have acquaintances* into two groups, which will be used for two paragraphs. Thus, the writer will have three paragraphs to support the main idea of the essay.

**Main idea:** A person needs both friends and acquaintances.

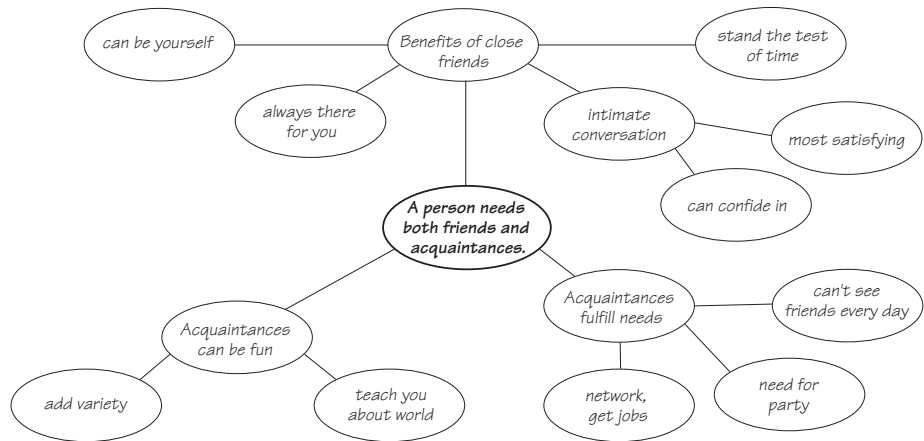
If diagrams help you see relationships, you may prefer to map your ideas.

- I. Benefits of close friends
  - A. Will always be there for you
  - B. Can be yourself
  - C. Intimate conversation
    - 1. Is most satisfying
    - 2. Can confide in
  - D. Stand the test of time
- II. Acquaintances can be a lot of fun
  - A. Add variety to life
  - B. Can teach you about the world
- III. Acquaintances fulfill some needs
  - A. Can't see close friends every day
  - B. Can help you network—get jobs
  - C. Need more than 2 best friends to have a party

### GED TIP

*It's good to have three groups of ideas for your GED essay, but sometimes two or four will make more sense. Plan to give yourself about 5 minutes to group and order your ideas.*

To make a **map**, write your main idea in the center of the page and circle it. Then draw lines going away from the circle. At the end of each line, write the label of a main group of ideas and circle it. Add ideas to each group, like this:



## Ordering Your Ideas

Once you have divided your ideas into groups, you must decide how to order the groups in your essay. The order of ideas depends on the purpose of your essay.

- If you are explaining causes and effects or listing reasons, number your groups in **order of importance**. When you write your essay, signal this organization by using transitions such as *first, second, and third, or more important and most important*.
- If you are analyzing similarities and differences, number your groups to show this **comparison and contrast**—similarities first and then differences, or vice versa. When you write your essay, signal this organization by using transitions. To show similarities, use *also, similarly, and in the same way*. To highlight differences, use *however, on the other hand, and in contrast*.
- If you are discussing **advantages and disadvantages**, number your groups so that you discuss the more significant group last. When you write your essay, signal this organization by using a transition such as *on the other hand* to shift from advantages to disadvantages, or vice versa.

Once you have grouped and ordered your ideas, you have a prewriting plan. You will follow this plan as you write your essay.

---

## CLEAR AND ORGANIZED WRITING ► PRACTICE 4.2

- A. **Directions:** Read the main idea and the ideas for the topic below. Cross out the irrelevant ideas. Then, on a separate sheet of paper, group the remaining ideas using a map or an outline.

**TOPIC**

Which is a better way to spend free time—going on vacation or staying at home?

**Main idea: Staying at home is better than going on vacation.**

costs less	can avoid crowds
can see friends	no negotiating unfamiliar territory
can vacation with friends	no asking strangers for directions
more relaxing	less chance of getting ripped off
no planning	opportunity to catch up on reading, knitting,
can play tourist in your home city	other hobbies, home improvement
should buy a new suitcase	

- B. **Directions:** On page 75, you brainstormed a list of ideas for the topic below. Look at that list now. On a separate sheet of paper, group your ideas using a map or an outline. Decide which order to present your ideas. Give yourself five minutes, but take more time if needed.

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Save your prewriting plan. You will use it during the next stage of the writing process, drafting.

**Answers and explanations start on page 630.**

## CLEAR AND ORGANIZED WRITING

## Essay Writing Process: Drafting

**Key Ideas**

- An effective essay has an introduction, a body, and a conclusion.
- Use your outline or idea map to develop topic sentences and supporting details.
- Don't worry about spelling or grammar when you are drafting an essay.

**GED TIP**

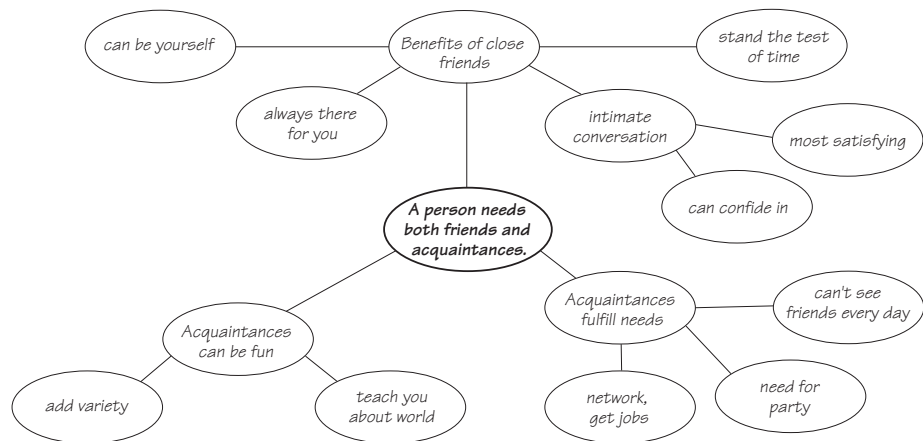
After you plan your essay, allow yourself about 25 minutes to write the draft.

Your prewriting plan is a blueprint for the next step in the writing process, **drafting**. Use your plan as a guide when you write the first draft of your essay. At this stage, don't worry about grammar and spelling. You will polish your essay later.

A good essay should have the following elements:

- An **introductory paragraph** that states the main idea of the essay and gives the reader a preview of what's to come
- **Body paragraphs** that expand on the main points, each with a topic sentence and supporting details
- A **concluding paragraph** that wraps up the essay

An idea map is shown below. Notice how it becomes a blueprint for an essay. The main idea of the map becomes the basis of the introductory paragraph. The main idea sentence in the introduction, which tells the point of the essay, is underlined.

**EXAMPLE**

**Introductory Paragraph:** A person needs both close friends and acquaintances because they meet the person's social needs in different ways. The special bond a person has with close friends is irreplaceable. However, there are times when it's helpful to have acquaintances.

Use each group of ideas on your map to develop one body paragraph. For example, the body paragraph on the next page is developed from the group shown on the map above. Notice that the main idea sentence (underlined) comes from the idea in the center of the group and that the supporting details are drawn from the ideas around it.

**EXAMPLE**

**Body Paragraph:** Close friendships have numerous benefits. For one thing, loyal friends are always there to support each other, no matter what happens. Some friendships last many years, becoming deeper and more meaningful with time. In addition, people can be themselves with friends. No one has to worry about not being perfect when he or she is among friends. Finally, nothing is more satisfying than the intimate conversations that true friends can have. They can confide and trust in each other.

Once you've written an introductory paragraph and your body paragraphs, write your conclusion. A good conclusion summarizes the main idea of the essay. It should also leave readers with something to think about.

**EXAMPLE**

**Concluding Paragraph:** In conclusion, although it's wonderful to have close friends, it's also important to have a wide circle of acquaintances. It is worthwhile to cultivate acquaintances, even though our relationships with them may be short and superficial. Acquaintances provide us with some things that we can't get from just a few close friends.

---

## CLEAR AND ORGANIZED WRITING ► PRACTICE 5

- A. **Directions:** Below are the body paragraphs of an essay. On a separate sheet of paper, write an introduction and a conclusion.

For one thing, when you teach children to be organized at an early age, they will have less difficulty with this skill later in life. Therefore, it is important to encourage children to put away their toys and to praise them when they do it, especially when they have taken the initiative. Later on, children can help you organize around the house. They'll be improving their organizing skills, and you will have a saner home!

A second point is that being organized helps children succeed in school. Teachers can get very frustrated when their students lose their homework or forget to do assignments. By being organized, your child is likely to avoid these problems.

Finally, when your children are organized, it makes your life easier. How many times have you been late to an appointment yourself because you were running around trying to find something that your child had lost? Do you always find yourself apologizing to friends because your kids make it impossible to keep to any sort of schedule? Improving your children's organizational skills will help you regain control of your own time.

- B. On page 77, you grouped and ordered your ideas on the topic below.

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Now use your prewriting plan to draft an essay on the topic. Use a separate sheet of paper. Your essay should include an introduction, body paragraphs, and a conclusion. Save your work. You will use it for the next step of the writing process, revising.

**Answers and explanations start on page 630**

# CLEAR AND ORGANIZED WRITING PRACTICE QUESTIONS

Questions 1 through 5 refer to the following paragraphs.

## The Effects of Lack of Sleep

### (A)

(1) Research shows that about 70 million North Americans have experienced the problem of sleep disruption. (2) Losing sleep is more than just an annoyance. (3) In some cases, it can have catastrophic results. (4) In the United States, sleepy drivers are responsible for at least 100,000 car crashes each year. (5) Most people need at least eight hours of shut-eye a night but get only six or seven. (6) Their fast-paced lives leave them little time for sleep. (7) Another factor is poor bedtime habits. (8) Family stresses may also cause sleep loss.

### (B)

(9) A study of high school students showed that students with low grades went to bed 40 minutes later and got 25 minutes less sleep than students with high grades. (10) Similarly, another study shows that when one gets fewer than six to eight hours of sleep, it is harder to learn new skills.

### (C)

(11) If you have trouble sleeping, avoid caffeine and alcohol. (12) Get regular exercise during the day, when it won't make you too energized to sleep. (13) Exercise can also help you lose weight.

### (D)

(14) Set times for going to bed and getting up each day, and stick to them. (15) Don't watch TV or use a computer late at night, since these stimulate visual response and interfere with sleep. (16) If you find you still can't sleep, get up and do something.

1. Which revision would improve the effectiveness of the article?

Begin a new paragraph with

- (1) sentence 3
- (2) sentence 4
- (3) sentence 5
- (4) sentence 6
- (5) sentence 7

2. Which sentence would be most effective if inserted at the beginning of paragraph B?

- (1) Some high school students get better grades than others.
- (2) High-achieving students get more sleep.
- (3) Lack of sleep interferes with concentration.
- (4) Not getting enough sleep is a big problem.
- (5) People need more sleep than they used to.

3. Sentences 9 and 10: **A study of high school students showed that students with low grades went to bed 40 minutes later and got 25 minutes less sleep than students with high grades. Similarly, another study shows that when one gets fewer than six to eight hours of sleep, it is harder to learn new skills.**

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) grades. Similarly,
- (2) grades, likewise,
- (3) grades. Moreover
- (4) grades. As a result,
- (5) grades. Therefore,

4. Sentence 13: **Exercise can also help you lose weight.**

Which revision should be made to the placement of sentence 13?

- (1) move sentence 13 to follow sentence 9
- (2) move sentence 13 to follow sentence 11
- (3) move sentence 13 to follow sentence 14
- (4) move sentence 13 to follow sentence 15
- (5) remove sentence 13

5. Which revision would improve the effectiveness of the article?

- (1) join paragraphs B and C
- (2) move sentence 11 to the end of paragraph B
- (3) remove sentence 14
- (4) join paragraphs C and D
- (5) no revision is necessary



---

Questions 6 through 10 refer to the following paragraphs.

### Getting Out Those Troublesome Stains

#### (A)

(1) Have you ever ruined a nice piece of clothing by staining it? (2) If so, the following information on stain removal may interest you. (3) By learning a few simple rules and keeping some household cleaners on hand, you can preserve your clothing. (4) First of all, the faster you act, the better. (5) With time, the stain will set. (6) Be sure to blot the stain rather than scrubbing it. (7) Scrubbing can actually drive the stain into the fabric.

#### (B)

(8) Use hot water on a grease stain such as salad dressing and cold water on a water-based stain such as wine, pasta sauce, or blood. (9) If you don't know what the stain is or where it came from, use room-temperature water. (10) Otherwise you might set the stain.

#### (C)

(11) Sometimes other liquids are more effective than water. (12) Lemon juice, for example removes ink, rust, and iodine. (13) White vinegar takes out alcohol, coffee, deodorants, and glue. (14) Liquid shampoo can be used on oil, tar, and grease. (15) Not surprisingly, it works the same way on an oil stain as it does on oil in your hair. (16) Rubbing alcohol removes stains from grass and soft drinks.

#### (D)

(17) If you find that a stain is not going away or is getting worse, stop and take your clothes to a dry cleaner. (18) Professionals know best. (19) Home remedies may not work on every stain.

6. Which revision would improve the effectiveness of the article?

Begin a new paragraph with

- (1) sentence 3
- (2) sentence 4
- (3) sentence 5
- (4) sentence 6
- (5) sentence 7

7. Which sentence would be most effective if inserted at the beginning of paragraph B?

- (1) Hot and cold water have many uses.
- (2) Choose the right water temperature for cleaning each stain.
- (3) Try to avoid setting the stain.
- (4) Hot water takes out tough stains.
- (5) The second step is to determine the proper use of hot water.

8. Sentence 12: **Lemon juice, for example removes ink, rust, and iodine.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) juice, for example removes
- (2) juice, for example. Removes
- (3) juice for example removes
- (4) juice, for example, removes
- (5) juice. For example, removes

9. Which revision would improve the effectiveness of paragraph C?

- (1) remove sentence 11
- (2) move sentence 11 to follow sentence 12
- (3) move sentence 12 to follow sentence 14
- (4) remove sentence 14
- (5) remove sentence 15

10. Sentence 19: **Home remedies may not work on every stain.**

Which revision should be made to the placement of sentence 19?

- (1) move sentence 19 to the beginning of paragraph C
- (2) move sentence 19 to follow sentence 13
- (3) move sentence 19 to follow sentence 15
- (4) move sentence 19 to the beginning of paragraph D
- (5) no revision is necessary



---

Questions 11 through 14 refer to the following memo.

To: All Employees  
From: Denise Ellis, Benefits Manager

**(A)**

(1) Starting on January 1, Allcity will no longer be our insurance carrier. (2) Instead, you will have a choice of two other insurance carriers: HealthPlan and Rainbow Insurance Company.

**(B)**

(3) HealthPlan is an HMO. (4) You will not have to pay any money to doctors in advance with this plan, but you must go to doctors listed with the insurance company. (5) HMOs are becoming increasingly popular. (6) With Rainbow Insurance, you may choose any doctor you wish. (7) However you must pay the health providers when you receive the service. (8) Afterwards, you submit the receipts to Rainbow Insurance. (9) Representatives of both companies will be here on December 2 to discuss the details of their plans. (10) Please sign up for an informational session on that day. (11) The sign-up sheet is on the door of the conference room, where the meetings will take place.

**(C)**

(12) At the meeting, you will receive a card on which you must indicate your choice of company. (13) Please mark your choice in the appropriate box and submit it to me by December 5.

**(D)**

(14) If you do not submit your card in time, you may not be insured for the month of January. (15) If you are not able to attend any of the informational sessions, please let me know right away. (16) Feel free to contact me at ext. 2453 with any questions you may have about this process.

11. Which revision would improve the effectiveness of paragraph B?

- (1) remove sentence 3
- (2) move sentence 5 to the beginning of paragraph B
- (3) move sentence 5 to follow sentence 3
- (4) remove sentence 5
- (5) no revision is necessary

12. Sentence 7: **However you must pay the health providers when you receive the service.**

Which correction should be made to sentence 7?

- (1) insert a comma after However
- (2) change pay to have paid
- (3) insert a comma after when
- (4) change receive to receives
- (5) no correction is necessary

13. Which revision would improve the effectiveness of the memo?

Begin a new paragraph with

- (1) sentence 6
- (2) sentence 7
- (3) sentence 8
- (4) sentence 9
- (5) sentence 10

14. Sentence 14: **If you do not submit your card on time, you may not be insured for the month of January.**

Which revision should be made to the placement of sentence 14?

- (1) move sentence 14 to the end of paragraph C
- (2) move sentence 14 to follow sentence 15
- (3) move sentence 14 to follow sentence 16
- (4) remove sentence 14
- (5) no revision is necessary

---

Questions 15 through 19 refer to the following paragraphs.

### Repairing a Flat Bicycle Tire

#### (A)

(1) The first step in fixing a flat bicycle tire is to remove the wheel. (2) Before you begin, let out any air in the tire. (3) Next, release the brake. (4) If you are removing the back wheel, put the derailleur in high gear. (5) Then take off the axle nuts by unscrewing counterclockwise. (6) If your bike has safety washers, remove these also. (7) Put them on the wheel so that you can keep track of them.

#### (B)

(8) Remove the tire, and mark the valve stem position on it. (9) If possible, remove the tire without using tools, because the inner tube punctures easily. (10) Use tire levers or the backs of forks and spoons if necessary. (11) When you find the leak, scrape the spot with sandpaper. (12) Remove the inner tube and inflate it, listening and feeling for air leaks. (13) Then apply cement to the tube, and let it dry completely before putting the patch on.

#### (C)

(14) First, inflate the tube and make sure the leak has been fixed. (15) Next, slip the inner tube back into the tire, and put the tire back on the rim. (16) Then inflate the tube to the correct pressure. (17) The pressure is right when there is enough air to steady the tire but not so much air that the tire cannot be squeezed between the brake pads.

#### (D)

(18) Put the bike back on its wheels, and then tighten the wheel nuts. (19) Moreover, readjust the tire pressure, and you're ready to ride!

15. Which revision would improve the effectiveness of paragraph A?

- (1) begin a new paragraph with sentence 4
- (2) begin a new paragraph with sentence 5
- (3) move sentence 5 to follow sentence 7
- (4) remove sentence 6
- (5) no revision is necessary

16. Which revision would improve the effectiveness of paragraph B?

- (1) remove sentence 11
- (2) move sentence 11 to follow sentence 9
- (3) move sentence 11 to follow sentence 12
- (4) move sentence 11 to follow sentence 13
- (5) no revision is necessary

17. Which sentence would be most effective if inserted at the beginning of paragraph C?

- (1) All you have to do now is take care of the tire pressure.
- (2) There are a lot of other things you still have to do in order to fix the flat.
- (3) Fixing a flat tire is a long process that requires a lot of patience.
- (4) The next step is to put the tire and tube back onto the rim.
- (5) Patching the leak properly is also very important.

18. Which sentence would be most effective if inserted at the beginning of paragraph D?

- (1) The final step is to reinstall the wheel.
- (2) Fixing a flat tire requires careful planning.
- (3) Whether you are an experienced cyclist or just a beginner, you can fix a flat tire.
- (4) Second, don't forget to tighten the wheel nuts.
- (5) Try not to use sharp tools to fix a flat tire.

19. Sentence 19: **Moreover, readjust the tire pressure, and you're ready to ride!**

Which correction should be made to sentence 19?

- (1) replace Moreover, with Then
- (2) change readjust to readjusting
- (3) remove the comma after pressure
- (4) replace you're with your
- (5) no correction is necessary

**Answers and explanations start on page 630.**

# MATH BASICS PRACTICE QUESTIONS

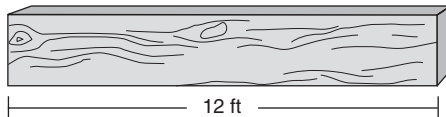
## PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

- A beverage container holds 12 servings. If the serving size is 8 ounces, how many ounces does the container hold in all?
  - 4
  - 20
  - 32
  - 48
  - 96
- Angelo bought a used car with 39,451 miles on it. If the car now has 70,040 miles on it, how many miles has Angelo driven the car?
  - 30,000
  - 30,589
  - 39,459
  - 70,040
  - 109,491

- Sales at 3 concession stands are \$839, \$527, and \$726. What is the total amount in sales?
  - \$242
  - \$1581
  - \$2092
  - \$2178
  - \$2517
- If Emory paid 20% of \$3280 as a down payment, how much was the down payment?
  - \$164
  - \$328
  - \$656
  - \$3300
  - \$6560

- If you want to cut 24 two-foot braces, how many boards of the length shown below would you need?



- 4
  - 6
  - 12
  - 24
  - Not enough information is given.
- Inventory shows that a warehouse has 45 printers in stock. If each printer is valued at \$125, what is the total value of the printer inventory?
    - \$5625
    - \$170
    - \$80
    - \$55
    - \$45
  - Lydia traveled 180 miles in 3 hours. Which of the following expressions shows how far she could drive over a period of 7 hours at the same rate?
    - $\frac{180}{3}$
    - $7 \times 3 \times 180$
    - $7\left(\frac{180}{3}\right)$
    - $180 \times 3$
    - $7\left(\frac{3}{180}\right)$
- What is the value of  $\sqrt{441}$ ?
    - 11
    - 21
    - 221
    - 441
    - 882

9. Janelle wants to drive from Danville to Brownsville. If she averages 60 miles per hour, which expression shows how many hours it will take her to drive the distance?



- (1)  $480 + 60$   
 (2)  $480 - 60$   
 (3)  $480 \times 60$   
 (4)  $\frac{480}{60}$   
 (5)  $\frac{60}{480}$
10. A company sold a total of \$1440 in gift bears for Valentine's Day. If the gift bears cost \$15 apiece, how many gift bears did it sell?
- (1) 15  
 (2) 96  
 (3) 144  
 (4) 1440  
 (5) 1455
11. In addition to interest charges, Richard's credit card company charges a \$25 late fee for payments made after the payment due date. If he was charged a late fee for 8 different monthly bills, how much could he have saved by paying the bills on time?

- (1) \$200  
 (2) \$96  
 (3) \$80  
 (4) \$33  
 (5) \$25

12. A waiter has seven \$5 bills and eighteen \$1 bills from tips. In all, how much does he have in tips?

- (1) \$5  
 (2) \$18  
 (3) \$25  
 (4) \$35  
 (5) \$53

13. A car manufacturer recommends an oil and filter change every 3,500 miles. If April took her car in for an oil change at 43,286 miles, what was the odometer reading at her last oil change?

- (1) 50,286  
 (2) 46,786  
 (3) 43,286  
 (4) 39,786  
 (5) Not enough information is given.

14. A clinic treated 536 children over a 4-month period. At this rate, how many children did the clinic treat in 1 month?

- (1) 134  
 (2) 532  
 (3) 536  
 (4) 540  
 (5) 2144

15. Attendance at a local play was 438 Friday night, 820 Saturday night, and 636 Sunday afternoon. How many more people attended the play on Sunday than on Friday?

Mark your answer in the circles on the grid at the bottom of the page.

16. Raquel has 4 payments left on her car. If each payment is \$268, how much does she still owe on her car?

Mark your answer in the circles on the grid at the bottom of the page.

15.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

16.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

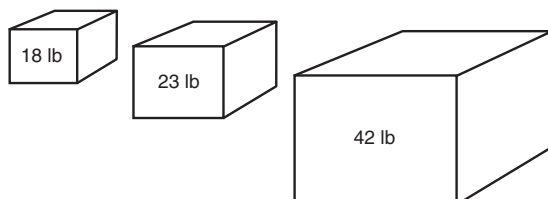
17. In what order should items weighing 51 pounds, 40 pounds, 48 pounds, and 44 pounds be stacked if you want them in order from heaviest to lightest?

(1) 51, 44, 40, 48  
(2) 40, 44, 48, 51  
(3) 51, 48, 44, 40  
(4) 48, 44, 40, 51  
(5) 51, 40, 44, 48

18. Which of the following correctly shows 2,354,769 rounded to the nearest ten thousand?

(1) 2,400,000  
(2) 2,355,000  
(3) 2,354,800  
(4) 2,350,000  
(5) 2,000,000

19. What is the total weight in pounds of the packages below?



(1) 83  
(2) 65  
(3) 60  
(4) 42  
(5) 41

20. Jason paid a \$14 dinner bill with a \$20 bill. How much change should he receive?

(1) \$6  
(2) \$7  
(3) \$14  
(4) \$20  
(5) \$34

21. Maria spent 8 minutes installing a new showerhead, 33 minutes rodding out a drain, and 18 minutes fixing a leaking faucet. About how many minutes did it take Maria to complete the plumbing job?

(1) 90  
(2) 60  
(3) 30  
(4) 20  
(5) 10

22. Carla drove 250 miles in 4 hours. Which of the following could be used to determine her average rate of speed?

(1)  $\frac{4}{250}$   
(2)  $250 + 4$   
(3)  $250 - 4$   
(4)  $\frac{250}{4}$   
(5)  $4 \times 250$

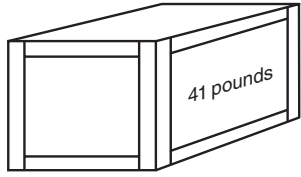
23. A bulk bag of nuts weighs 144 ounces. If the nuts are packaged in smaller 8-ounce bags, how many bags will there be?

(1) 8  
(2) 12  
(3) 18  
(4) 136  
(5) 152

24. If you drove 299 miles on 9 gallons of gasoline, about how many miles per gallon did the car get?

(1) 10  
(2) 30  
(3) 270  
(4) 300  
(5) 320

25. A shipment of 33 crates like the one shown below is delivered. Approximately how many pounds did workers unload?



- (1) 30
- (2) 40
- (3) 120
- (4) 1200
- (5) 2000

26. Four friends bought a birthday cake for \$21 and balloons for \$15. If they divided the cost equally, how much did each friend pay toward the birthday party?

- (1) \$4
- (2) \$5
- (3) \$9
- (4) \$20
- (5) \$36

27. David paid \$8 toward a dinner bill of \$84. If the bill is divided equally among the remaining 9 people in the group, which of the following expressions shows how much each person should pay?

- (1)  $\$84 - \$8 - 9$
- (2)  $9 \times \$8$
- (3)  $\frac{\$84}{9}$
- (4)  $\frac{\$84 - \$8}{9}$
- (5)  $\$84 - (\$8 \times 9)$

28. A driver traveled 4 hours at an average rate of 65 miles per hour. How many miles did the person drive?

- (1) 16
- (2) 61
- (3) 65
- (4) 69
- (5) 260

29. Using the following information, how much would a large pizza with 3 toppings cost?

Large 1-Topping Pizza for \$14 \$2 for Each Additional Topping
---

- (1) \$20
- (2) \$18
- (3) \$16
- (4) \$14
- (5) \$10

30. Bagels are 2 for \$1. How many bagels could you buy for \$7?

- (1) 3
- (2) 7
- (3) 10
- (4) 14
- (5) 15

31. How many months would it take to pay back \$1800 at \$75 per month?

Mark your answer in the circles on the grid at the bottom of the page.

32. How many 45-page documents would a binder hold if its maximum capacity is 630 sheets of paper?

Mark your answer in the circles on the grid at the bottom of the page.

31.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

32.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Answers and explanations begin on page 664.

# RATIO, PROPORTION, AND PERCENT

## PRACTICE QUESTIONS

### PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

- From a total yearly budget of \$360,000, the Kimball Foundation spends \$30,000 on leasing office space. What is the ratio of dollars spent on office space to dollars spent on other costs?
  - 12:1
  - 11:1
  - 11:12
  - 1:11
  - 1:12
- A worker can assemble 5 motors in 2 hours. Which of the expressions below could be used to find how long it would take the worker to assemble 50 motors?
  - $2 \times \frac{50}{5}$
  - $\frac{5 \times 50}{2}$
  - $\frac{2}{5 \times 50}$
  - $\frac{5}{2 \times 50}$
  - $2 \times 5 \times 50$
- Frank owns a discount music store. The table below shows how much Frank pays for certain merchandise items.

Item	Wholesale Price
CDs	\$7.20
Cassette tapes	\$5.60

To find his selling price, Frank increases each price by 35%. What is the selling price of a cassette tape?

- \$9.72
- \$7.56
- \$5.95
- \$3.64
- \$1.96

- Neva's car is now worth \$12,000. This is 60% of what she paid for it. How much did she pay for the car?
  - \$7,200
  - \$18,000
  - \$19,200
  - \$20,000
  - Not enough information is given.
- At a shop, the ratio of union to non-union workers is 7 to 3. If there are 18 nonunion workers at the shop, how many union workers are there?
  - 8
  - 21
  - 25
  - 42
  - 126
- Camilla earned \$954 in commission on \$15,900 in sales. What is her rate of commission?
  - 6%
  - 9%
  - $16\frac{2}{3}\%$
  - 35%
  - 60%
- John spent the following amounts of time building a workbench:

drawing the plans: 2 hours  
 cutting the wood:  $1\frac{1}{2}$  hours  
 assembling the workbench: 2 hours  
 sanding and sealing:  $3\frac{1}{2}$  hours

What is the ratio of time spent cutting wood to total time spent on the project?

- 1:9
- 1:6
- 1:5
- 3:7
- 3:4



Questions 8 and 9 refer to the following information.

Ford County Farmland Usage Total Acreage: 40,000	
Usage	Number of Acres
Dairy	22,000
Nursery/greenhouse	3,600
Vegetables/fruits	5,200
Grains	9,200

8. What percent of Ford County farmland is used for the growing of grains, vegetables, or fruits?

- (1) 13%
- (2) 23%
- (3) 36%
- (4) 57%
- (5) 64%

9. Last year the total farmland acreage in Ford County was 25% less than the amount shown in the table. What percent of the last year's total acres were used for dairy production?

- (1) 30%
- (2) 41%
- (3) 55%
- (4) 73%
- (5) Not enough information is given.

10. A serving of peanut butter contains 3 grams of saturated fat and 13 grams of unsaturated fat. This amount of fat is 25% of the recommended amount of fat in a 2000-calorie diet. What is the ratio of grams of saturated fat to total fat in a serving of peanut butter?

- (1)  $\frac{3}{16}$
- (2)  $\frac{3}{13}$
- (3)  $\frac{13}{16}$
- (4)  $\frac{13}{3}$
- (5)  $\frac{16}{3}$

11. A drawing of a company logo is 4 inches wide and 5 inches long. If the drawing is enlarged so that it is 12.5 inches long, how many inches wide will the enlargement be?

- (1) 7.5
- (2) 10.0
- (3) 15.625
- (4) 20.0
- (5) 32.5

12. A local hospital currently has 184 male patients. If the ratio of male to female patients is 4:3, how many female patients are there in the hospital?

Mark your answer in the circles on the grid at the bottom of the page.

13. A newspaper advertisement contains the following information.

Busy Body Fitness Center Inventory Reduction Blowout! All sale prices are 20% off original price!	
Equipment	Sale Price
Treadmill	\$1512
Upright bike	\$720
Home gym	\$3148

In dollars, what was the original price of the upright bike?

Mark your answer in the circles on the grid at the bottom of the page.

12.

	7	7	7	
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

13.

	7	7	7	
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9



## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

14. The Tigers' ratio of wins to losses is 5 to 4. If the team continues winning at the same rate, how many games will the Tigers win in a 72-game season?
- (1) 20  
(2) 40  
(3) 37  
(4) 52  
(5) 58
17. Six months ago, Sandra had 55 regular customers. Now the number of customers has increased by 220%. How many customers does she have now?
- (1) 121  
(2) 90  
(3) 66  
(4) 25  
(5) Not enough information is given.

15. A television station called 400 adults and asked the following question: "Do you approve of the governor's new education program?" The table below shows the results of the survey:

Response	Percent
Undecided	16%
Yes	32%
No	52%

Of the people called, how many did not answer "no"?

- (1) 64  
(2) 128  
(3) 192  
(4) 208  
(5) Not enough information is given.
16. The price of a carton of computer paper decreased from \$24 to \$19. Which of the following expressions could be used to find the percent of decrease in the price?
- (1)  $\frac{\$24}{\$24 - \$19} \times 100$   
(2)  $\frac{\$19}{\$24 - \$19} \times 100$   
(3)  $\frac{\$19}{\$24} \times 100$   
(4)  $\frac{\$24 - \$19}{\$19} \times 100$   
(5)  $\frac{\$24 - \$19}{\$24} \times 100$
18. If 1 gram of fat equals 9 calories, what percent of the calories in a Munchies roast beef sandwich come from fat?

**Munchies Sandwich Facts**

Sandwich	Fat (grams)	Calories
Roast Beef	6	300
Club Classic	5	335

- (1) 2%  
(2) 3%  
(3) 6%  
(4) 18%  
(5) 54%

19. For every \$8 in their budget, the Parks spend \$3 on food. If their weekly budget is \$704, how much do they spend on food each week?
- (1) \$88  
(2) \$188  
(3) \$192  
(4) \$235  
(5) \$264

20. Suddeth Travel estimates that 80% of its employees have more than 12 days of unused sick leave. If 140 employees have more than 12 days of unused sick leave, how many employees work at the agency?
- (1) 112  
(2) 164  
(3) 175  
(4) 700  
(5) Not enough information is given.

21. The Gladstone Theater has 900 seats. At a recent show, the ratio of tickets sold to tickets unsold was 11 to 1. How many tickets were sold to the show?

- (1) 75
- (2) 82
- (3) 810
- (4) 818
- (5) 825

22. Matthew put \$2200 in a savings account for one year six months. If he earns simple interest at an annual rate of 8%, how much will he have in the account at the end of the time period?

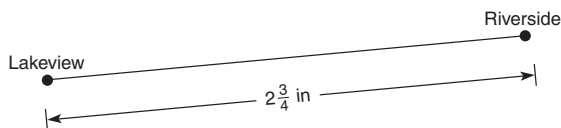
- (1) \$1936
- (2) \$2212
- (3) \$2376
- (4) \$2464
- (5) \$2640

23. A television set that is regularly priced at \$410 is on sale for 20% off. Which of the following expressions could be used to find the sale price of the television set?

- (1)  $\$410 - (\$410 \times 0.2)$
- (2)  $\$410 - \frac{\$410}{0.2}$
- (3)  $\$410 - \frac{0.2}{\$410}$
- (4)  $\$410 \times 0.2 \times 100$
- (5)  $(\$410 \times 0.2) + \$410$

24. On a county map shown below, the map scale reads, "0.5 in = 60 mi."

What is the actual distance in miles between Lakeview and Riverside?



- (1) 23
- (2)  $82\frac{1}{2}$
- (3) 165
- (4) 300
- (5) 330

Question 25 refers to the following information.

Leo's Bookstore kept track of the number of customers who visited the store over a 3-day period. They also recorded the number of sales for each day during the same period.

Day	Number of Customers	Number of Sales
Friday	112	83
Saturday	138	45
Sunday	140	91

25. Which of the following could be used to find what percent of Sunday's customers did not make a purchase?

- (1)  $91/140$
- (2)  $91/140 \times 100$
- (3)  $(140 - 91)/140 \times 100$
- (4)  $(140 - 91)/91 \times 100$
- (5)  $140/91 \times 100$

26. A school admits 9 out of every 14 who apply. At that rate, how many students will be admitted if 420 apply?

Mark your answer in the circles on the grid at the bottom of the page.

27. In a 40-hour workweek, Marcie spends 15 hours answering telephones. What is the ratio of hours spent answering telephones to hours doing other types of work? (Record your answer as a fraction.)

Mark your answer in the circles on the grid at the bottom of the page.

26.

	/	/	/	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

27.

	/	/	/	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Answers and explanations begin on page 670.

# DATA ANALYSIS PRACTICE QUESTIONS

## PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

Questions 1 and 2 refer to the following graph.



1. The mean number of aircraft orders for the six years shown on the graph is 573 planes. In which year was the number of orders closest to the mean?

- (1) 1995
- (2) 1996
- (3) 1997
- (4) 1998
- (5) 1999

2. By about what percent did orders at National Aircraft decrease from 1998 to 1999?

- (1) 26%
- (2) 30%
- (3) 40%
- (4) 68%
- (5) 75%

3. At a convention, Jim and his three friends each bought three raffle tickets. At the time of the drawing, 400 tickets had been sold. What is the probability that either Jim or one of his friends will win?

- (1)  $\frac{3}{100}$
- (2)  $\frac{1}{25}$
- (3)  $\frac{3}{50}$
- (4)  $\frac{9}{100}$
- (5)  $\frac{3}{25}$

Questions 4 through 6 are based on the following table.

Southland Weather March 9			
Area	High Temp.	Low Temp.	Precipitation (in inches)
Downtown	65° F	53° F	0.45
Airport	62° F	50° F	0.63
Woodland Hills	68° F	50° F	1.34
East Village	56° F	48° F	3.53
Ventura	62° F	49° F	2.57
Highland Park	64° F	55° F	0.84

4. Based on the data in the table, what was the median low temperature for March 9?

- (1) 63°
- (2) 62.8°
- (3) 51.5°
- (4) 50.8°
- (5) 50°

5. What was the mean amount of precipitation (in inches) on March 9 for the areas listed in the table?

- (1) 0.65
- (2) 1.09
- (3) 1.56
- (4) 1.99
- (5) 2.44

6. For which area on the table was there the greatest range, or difference, between the high and low temperatures?

- (1) Highland Park
- (2) Ventura
- (3) East Village
- (4) Woodland Hills
- (5) Downtown

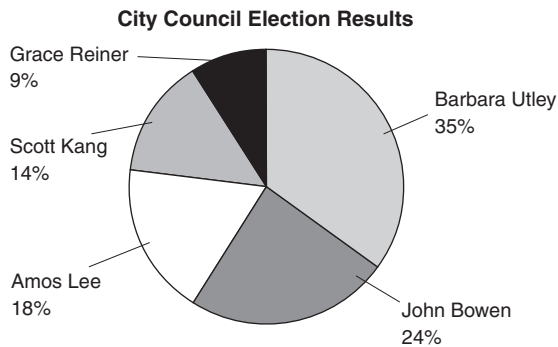


## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

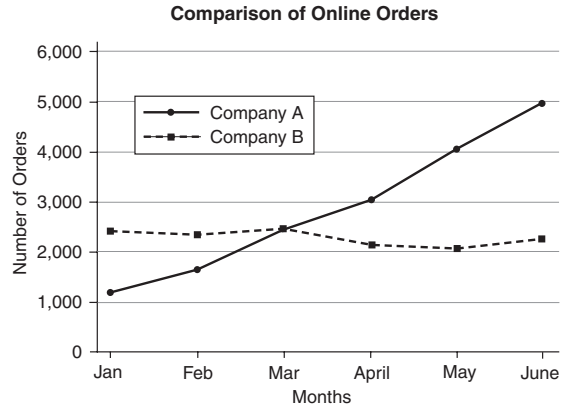
Questions 13 through 15 refer to the following graph.

In a recent election, five candidates ran for the city council seat from District 11. The results of the race are shown in the graph below.



13. The three city council candidates who received the fewest votes received what percent of the total vote?
- (1) 23%
  - (2) 41%
  - (3) 56%
  - (4) 77%
  - (5) Not enough information is given.
14. Which two candidates combined received about  $\frac{3}{5}$  of the votes cast?
- (1) Grace and Utley
  - (2) Kang and Utley
  - (3) Lee and Utley
  - (4) Bowen and Utley
  - (5) Lee and Bowen
15. If 5100 votes were cast in the election, which of the following expressions could be used to find out how many votes Grace Reiner received?
- (1)  $5100 \times 0.9$
  - (2)  $\frac{5100}{0.9}$
  - (3)  $\frac{5100}{0.09}$
  - (4)  $5100 - (5100 \times 0.09)$
  - (5)  $5100 \times 0.09$

Questions 16 through 18 refer to the following graph.



16. In which month did Company A and Company B receive about the same number of online orders?
- (1) January
  - (2) February
  - (3) March
  - (4) April
  - (5) May
17. Based on the trends shown by the data, what would be the best prediction for the number of online orders in July for Company A?
- (1) 7200
  - (2) 5900
  - (3) 5200
  - (4) 4900
  - (5) 4200
18. About 18% of the online orders at Company A are returned for credit or exchange. What percent of the orders at Company B are returned for credit or exchange?
- (1) 15%
  - (2) 18%
  - (3) 36%
  - (4) 82%
  - (5) Not enough information is given.

Questions 19 and 20 are based on the following information.

A basketball player's statistics for an 8-game series are shown in the table below.

Game	Shots Attempted	Shots Made
1	25	10
2	23	12
3	26	10
4	24	13
5	29	15
6	18	7
7	24	12
8	27	10

19. What was the median number of shots attempted in the series?

- (1) 23
- (2) 24
- (3) 24.5
- (4) 25
- (5) 26.5

20. What is the mode of the shots made during the series?

- (1) 12
- (2) 11
- (3) 10 and 12
- (4) 10
- (5) Not enough information is given.

21. A bag contains 24 marbles. Eight are red, six are blue, and ten are white. A marble is drawn from the bag and replaced. A second marble is chosen at random from the bag. What is the probability that the first marble is red and the second is white?

- (1)  $\frac{2}{5}$
- (2)  $\frac{1}{6}$
- (3)  $\frac{5}{36}$
- (4)  $\frac{5}{48}$
- (5)  $\frac{1}{48}$

22. A company has 36 employees. For three months, the owner has kept track of the number of sick days used by her employees per month.

Month	Sick Days
Sept.	34
Oct.	31
Nov.	42

Which expressions could be used to find the average number of sick days taken each month?

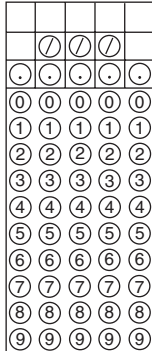
- (1)  $\frac{34 + 31 + 42}{36}$
- (2)  $\frac{34 + 31 + 42}{3}$
- (3)  $\frac{34 + 31 + 42 + 36}{4}$
- (4)  $\frac{34 + 31 + 42 + 36}{3}$
- (5)  $(34 + 31 + 42) \times 3$

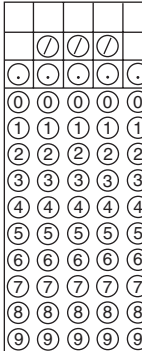
23. Andy rolls two standard six-sided dice. What is the probability of rolling two ones?

Mark your answer in the circles on the grid at the bottom of the page.

24. Kate drove 158 miles on Monday, 276 miles on Tuesday, 54 miles on Wednesday, 305 miles on Thursday, and 210 miles on Friday. In miles, what was the median distance she drove for the five days?

Mark your answer in the circles on the grid at the bottom of the page.

23. 

24. 

Answers and explanations begin on page 672.

## MEASUREMENT

## The English System of Measurement

## Key Ideas

- Multiply to change from a larger unit of measure to a smaller one.
- Divide to change from a smaller unit of measure to a larger one.
- When dividing, the remainder is the same unit of measure as the number you are dividing by.

## GED TIP

The measurement facts shown in the table on this page will not be given to you anywhere on the GED Math Test. You must memorize them in order to answer the measurement questions correctly.

## Standard Units of Measure

Measurements are used to describe an object's length, weight, or volume. We also use measurement to describe a quantity of time. The United States uses the English, or standard, system of measurement. Study the table below to learn the common standard units and their abbreviations.

## Measurement Equivalencies

## Length

1 foot (ft) = 12 inches (in)

1 yard (yd) = 3 ft

1 mile (mi) = 5280 ft

## Volume

1 cup (c) = 8 fluid ounces (fl oz)

1 pint (pt) = 2 c

1 quart (qt) = 2 pt

1 gallon (gal) = 4 qt

## Weight

1 pound (lb) = 16 ounces (oz)

1 ton (t) = 2000 lb

## Time

1 minute (min) = 60 seconds (sec)

1 hour (hr) = 60 min

1 day = 24 hr

1 week = 7 days

1 year (yr) = 12 months (mo) = 365 days

To solve problems, you will need to change from one unit of measure to another. If you need to *change a larger unit of measure to a smaller one*, you need to *multiply*. Use the measurement equivalencies above.

**Example 1:** A picture frame is 3 ft 8 in long. What is the length of the frame in inches?

1. Change 3 feet to inches using the fact that  $3 \text{ ft} \times 12 = 36 \text{ in}$   
1 foot = 12 inches.

2. Add the remaining 8 inches.  $36 + 8 = 44 \text{ in}$

The picture frame is **44 inches** in length.

To change a *smaller unit of measure to a larger one*, *divide* using the appropriate measurement equivalency.

**Example 2:** A package weighs 84 ounces. What is the weight of the package in pounds?

1. Change 84 ounces to pounds. Since 1 pound = 16 ounces, divide by 16.

$$\begin{array}{r} 5 \\ 16 \overline{)84} \\ \underline{-80} \\ 4 \end{array}$$

2. The remainder is in ounces, the same unit you started with. Therefore, the package weighs **5 lb 4 oz**, or you can express the remainder as a fraction.  $5\frac{4}{16} = 5\frac{1}{4} \text{ lb}$



You may need to do a series of conversions.

**Example 3:** A container holds 1.5 gallons. How many cups does the container hold?

1. Change 1.5 gallons to quarts. (Use the fact  $1 \text{ gal} = 4 \text{ qt.}$ )  $1.5 \text{ gal} \times 4 = 6 \text{ qt}$
2. Change 6 quarts to pints. (Use the fact  $1 \text{ qt} = 2 \text{ pt.}$ )  $6 \text{ qt} \times 2 = 12 \text{ pt}$
3. Change 12 pints to cups. (Use the fact  $1 \text{ pt} = 2 \text{ c.}$ )  $12 \text{ pt} \times 2 = 24 \text{ c}$

The container holds **24 cups**.

---

## MEASUREMENT ► PRACTICE 1.1

### A. Solve.

1. How many inches are equal to 4 feet?
2. How many minutes are equal to 420 seconds?
3. How many hours are in 3 days?
4. Convert 40 fluid ounces to pints.
5. Five gallons are equal to how many quarts?
6. 11,000 pounds equal how many tons?
7. Four yards equal how many inches?
8. How many hours are equal to 720 minutes?
9. How many cups are in two gallons?
10. How many pounds equal 128 ounces?
11. Eight yards equal how many feet?
12. How many feet equal  $1\frac{1}{2}$  miles?

### B. Choose the one best answer to each question. You may use a calculator.

Questions 13 through 15 refer to the following information.

**Portable Air Cooler**  
Duracool R612  
3.75 gallon capacity  
Runs 6 hours without refilling  
width: 27 in; depth: 16 in  
height:  $13\frac{3}{4}$  in  
shipping weight: 26 lb

13. Bob wants to buy an air cooler. He knows the capacity of several other models in quarts. Which of the following expressions could he use to find the capacity for this model in quarts?
  - (1)  $3.75 \times 2$
  - (2)  $3.75 \div 2$
  - (3)  $3.75 \times 4$
  - (4)  $3.75 \div 4$
  - (5)  $3.75 \times 8$
14. Which of these measurements is equal to the width of the Duracool R612?
  - (1) 2 ft 1 in
  - (2) 2 ft 3 in
  - (3)  $2\frac{1}{3}$  ft
  - (4)  $2\frac{1}{2}$  ft
  - (5) 2 ft 7 in
15. Another model, the R500, claims to run 250 minutes without refilling. How many minutes longer will the R612 run?
  - (1) 50
  - (2) 60
  - (3) 110
  - (4) 360
  - (5) Not enough information is given.

**Answers and explanations begin on page 673.**



## Solving Measurement Problems

In a measurement problem, you may need to add, subtract, multiply, or divide measurements. When finding a sum or a difference, remember that you can only add or subtract like measurement units.

**Example 1:** A deck requires pieces of railing that are 5 ft 9 in, 15 ft 4 in, and 8 ft 6 in. What is the total length of railing needed?

1. Write the measurements in a column, aligning like units of measure.

$$5 \text{ ft } 9 \text{ in}$$

$$15 \text{ ft } 4 \text{ in}$$

$$+ 8 \text{ ft } 6 \text{ in}$$

$$\hline 28 \text{ ft } 19 \text{ in}$$

2. Add like units.

3. Simplify the answer. (Change 19 in to 1 ft 7 in, and add to 28 ft.)

$$28 \text{ ft} + 1 \text{ ft } 7 \text{ in} = 29 \text{ ft } 7 \text{ in}$$

The deck requires **29 ft 7 in** of railing.

When you subtract, you may need to regroup, or borrow.

**Example 2:** How much more is 4 lb 3 oz than 2 lb 8 oz?

1. Align the problem. Since you cannot subtract 8 oz from 3 oz, regroup 1 pound from the pounds column, rewrite it as 16 ounces, and add it to the ounces column. (16 + 3 = 19)

$$\begin{array}{r} 3 \quad 19 \\ \cancel{4} \text{ lb } \cancel{3} \text{ oz} \\ - 2 \text{ lb } 8 \text{ oz} \\ \hline 1 \text{ lb } 11 \text{ oz} \end{array}$$

2. Subtract. The difference is **1 lb 11 oz**.

To multiply a measurement by a whole number, multiply the units of measure separately. Then simplify the result.

**Example 3:** Tony has five lengths of plastic pipe, each measuring 6 ft 10 in. What is the combined length of the pipe?

1. Multiply each part of the measurement by 5.

$$6 \text{ ft } 10 \text{ in}$$

$$\times \quad 5$$

2. Simplify using the fact 1 ft = 12 in.

$$30 \text{ ft } 50 \text{ in} = 30 \text{ ft} + 4 \text{ ft } 2 \text{ in} = 34 \text{ ft } 2 \text{ in}$$

The combined length is **34 ft 2 in**.

To divide a measurement, you can divide each part of the measurement and then add the results. However, it will usually be faster to rewrite the measurement in terms of the smallest unit of measure. Then divide and simplify.

**Example 4:** John has 1 pt 8 fl oz of liquid lawn fertilizer. He plans to mix one-third of the liquid with two gallons of water and apply it to his lawn. How many ounces of fertilizer will he use?

1. Change the amount to ounces.

$$1 \text{ pt} = 2 \text{ c} = 16 \text{ fl oz}$$

2. To find one-third, divide by 3.

$$1 \text{ pt } 8 \text{ fl oz} = 16 + 8 = 24 \text{ fl oz}$$

$$24 \text{ fl oz} \div 3 = 8 \text{ fl oz}$$

John will use **8 fluid ounces** of lawn fertilizer.

**Note:** On the GED Math Test, measurements in the answer choices are not usually labeled. Read the question carefully to know what measurement unit the answers represent.

## MEASUREMENT ► PRACTICE 1.2

A. Solve as directed. Simplify if necessary.

1. 
$$\begin{array}{r} 6 \text{ lb } 10 \text{ oz} \\ + 2 \text{ lb } 14 \text{ oz} \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 3 \text{ gal } 1 \text{ qt} \\ - 1 \text{ gal } 3 \text{ qt} \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 8 \text{ min } 10 \text{ sec} \\ \times \quad \quad 10 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 3 \text{ hr } 30 \text{ min} \\ 4 \text{ hr } 20 \text{ min} \\ + 2 \text{ hr } 45 \text{ min} \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 2 \text{ yd } 2 \text{ ft } 2 \text{ in} \\ - 4 \text{ ft } 8 \text{ in} \\ \hline \end{array}$$

8. 
$$\frac{11 \text{ ft } 8 \text{ in}}{2}$$

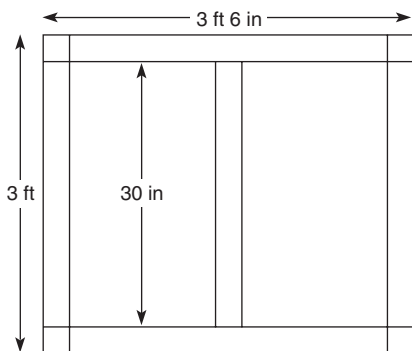
3. 
$$\begin{array}{r} 10 \text{ ft } 10 \text{ in} \\ + 5 \text{ ft } 8 \text{ in} \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 2 \text{ lb } 5 \text{ oz} \\ \times \quad \quad 6 \\ \hline \end{array}$$

9. 
$$\frac{5 \text{ min } 45 \text{ sec}}{5}$$

B. Choose the **one best answer** to each question.

Questions 10 and 11 refer to the following diagram.



10. Scott is building a platform for a play production. The diagram shows the measurements of the wood frame for the platform. How many feet of wood will Scott need to build the frame?

- (1) 9
- (2)  $10\frac{1}{2}$
- (3) 13
- (4)  $15\frac{1}{2}$
- (5) 108

11. The theater company buys the wood in 16-foot lengths. How many lengths measuring 30 inches can be cut from one 16-foot board?

- (1) 7
- (2) 6
- (3) 5
- (4) 4
- (5) 3

12. Nydia works in a photo lab. She uses 1 pt 6 fl oz of film developer from a full container. If the capacity of the container is 3 qt, how much developer is left in the container?

- (1) 2 qt 10 fl oz
- (2) 2 qt 6 fl oz
- (3) 2 qt 2 fl oz
- (4) 2 qt
- (5) 1 qt 10 fl oz

13. Max needs to ship six identical packages, each weighing 3 lb 12 oz. What is the total weight of the shipment?

- (1) 19 lb 2 oz
- (2) 22 lb 5 oz
- (3) 22 lb 8 oz
- (4) 24 lb 12 oz
- (5) 25 lb 2 oz

14. On Monday Jean spent 1 hr 45 min doing data entry. On Tuesday she spent 2 hr 30 min, and on Wednesday she worked 3 hr 45 min at the same task. How many hours did Jean spend doing data entry during the three days?

- (1)  $6\frac{1}{3}$
- (2) 7.2
- (3)  $7\frac{1}{4}$
- (4)  $7\frac{1}{2}$
- (5) 8

Answers and explanations begin on page 674.

## MEASUREMENT

## The Metric System

**Key Ideas**

- The metric system is based on the decimal place-value system.
- Each place-value column is named using a prefix and a standard unit of measure: meter, liter, or gram.
- To make conversions, use the prefixes to determine the relationship between units and move the decimal point.

**ON THE GED**

On the GED Math Test, you will not be asked to make conversions between the standard and metric systems.

**Common Metric Units**

The **metric system** is the measurement system used in most of the countries of the world. The main unit of length in the metric system is the **meter** (m). All other measurements are related in some way. The **gram** (g) is the basic metric measure of **mass** (or weight). The basic unit of volume is called the **liter** (l).

To form units of measure, add prefixes to the basic units described above. You will have an easier time learning the metric system if you memorize the meaning of the prefixes.

*milli-* (m) means one-thousandth    *deka-* (dam) means ten

*centi-* (c) means one-hundredth    *hecto-* means one hundred

*deci-* (d) means one-tenth    *kilo-* means one thousand

Therefore, a kilometer (km) equals 1000 meters, a milligram (mg) equals one one-thousandth gram, and a centiliter (cl) equals one one-hundredth liter.

You may find it helpful to memorize the following chart. As in our decimal place-value system, each column on the chart is 10 times the column to its right. To convert between metric units, count the spaces from the unit you are converting from to the unit you are converting to. Then move the decimal point that number of place values in the same direction.

kilo- (km)	hecto- (hm)	deka- (dam)	meter (m)	deci- (dm)	centi- (cm)	milli- (mm)
1000 m	100 m	10 m	1 m	0.1 m	0.01 m	0.001 m

*Note:* Although the chart uses the meter as the basic unit, the chart can also be used with liters (l) and grams (g).

**Example 1:** How many millimeters (mm) are equal to 3 centimeters (cm)?

1. Find *milli-* and *centi-* on the chart. The prefix *milli-* is one place to the right of the prefix *centi-*; therefore, you need to move the decimal point one place to the right to convert from centimeters to millimeters.
2. For example,  $3 \text{ cm} = 3.0 \text{ cm} = 30 \text{ mm}$ .

**Example 2:** How many grams (g) are equal to 6400 milligrams (mg)?

1. Start in the *milli-* column. The basic unit (or ones column) is three columns to the left. Move the decimal point three place-value columns to the left.
2. For example,  $6400 \text{ mg} = 6400. \text{ mg} = 6.4 \text{ g}$ .

If this is one of your first experiences with the metric system, it may seem confusing. You may want to memorize the following common conversions. You can use these facts to make conversions in the same way that you do in the English system of measurement.

- 1000 meters = 1 kilometer
- 1 meter = 100 centimeters
- 1 meter = 1000 millimeters
- 1 centimeter = 10 millimeters

← You can replace the word *meter* with either *liter* or *gram* in each conversion.

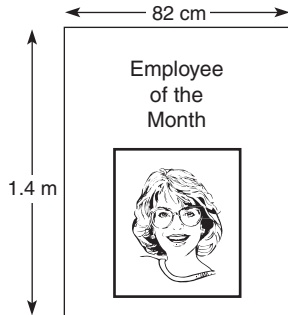
## MEASUREMENT ► PRACTICE 2.1

### A. Solve.

1. How many meters equal 5 kilometers?
2. 600 centimeters equal how many meters?
3. How many milligrams equal 4 grams?
4. Eight kilograms equal how many grams?
5. 40.5 liters equal how many centiliters?
6. How many liters are equal to 1500 ml?
7. 250 milligrams is equal to how many grams?
8. How many meters are in 30 kilometers?
9. 0.75 l is equal to how many cl?
10. 50 grams equal how many kilograms?
11. 35,200 milliliters equal how many liters?
12. How many centimeters are in 15 meters?

### B. Choose the one best answer to each question.

Question 13 refers to the following drawing.



13. A store manager is creating a display in the hall to reward outstanding employees. The measurements of the display are shown in the diagram. What is the height of the display in centimeters?
- (1) 0.014
  - (2) 0.14
  - (3) 14
  - (4) 140
  - (5) 1400

14. A can of machine oil holds 118.3 ml. How many liters of machine oil does the can hold?
- (1) 0.01183
  - (2) 0.1183
  - (3) 1.183
  - (4) 11.83
  - (5) 1183
15. In a vitamin supplement, each capsule contains 500 milligrams of vitamins. How many grams of vitamins are found in each capsule?
- (1) 5000
  - (2) 500
  - (3) 50
  - (4) 5
  - (5) 0.5

**Answers and explanations begin on page 674.**

## Solving Problems with Metric Measurement

Metric measurements are written as decimal numbers. Therefore, you can perform operations with metric measurements using the rules for adding, subtracting, multiplying, and dividing decimals.

**Example 1:** Three metal rods measure 1.5 meters, 1.85 meters, and 450 centimeters. What is the total length of the rods in meters?

1. Read the question carefully. You are asked to find the total length in *meters*.
2. The first two measures are written in meters. Convert the third measure to meters. 450 cm = 4.5 m
3. Add using the rules for adding decimals. The total is **7.85 m**.

$$\begin{array}{r} 1 \\ 1.5 \\ 1.85 \\ +4.5 \\ \hline 7.85 \end{array}$$

Follow the same steps to subtract.

**Example 2:** Tanya is jogging in a city park. The park has a path for joggers that is 2 kilometers in length. When she reaches the 750-meter checkpoint, how many kilometers does she have left to run?

1. You need to find the distance she has left in kilometers.
2. Change 750 meters to kilometers. 750 m = 0.75 km
3. Subtract using the rules for subtracting decimals.

$$\begin{array}{r} 1.910 \\ -0.75 \\ \hline 1.25 \end{array}$$

Tanya has **1.25 km** left to run.

Multiplying and dividing is much easier in the metric system. Follow the rules for multiplying and dividing decimals.

**Example 3:** Alex is a buyer at Rugs Plus. He plans to order 25 acrylic rugs to sell in the store. The shipping weight for each rug is 7.8 kilograms. What is the shipping weight in kilograms of the entire order?

1. Multiply the weight of one rug (7.8 kg) by 25.
2. The weight of 25 rugs is **195 kilograms**. Notice that the answer has the same unit of measure as the number you multiplied.

$$\begin{array}{r} 7.8 \\ \times 25 \\ \hline 390 \\ 1560 \\ \hline 1950 \end{array}$$

**Example 4:** At a food-processing plant, a tank holds 92.4 liters of a fruit drink. It takes three hours for a machine to empty the tank into small containers. How many liters of fruit drink are processed per hour?

1. To find the number per hour, divide 92.4 liters by 3.
2. The machine can process **30.8 liters** per hour.

$$\begin{array}{r} 30.8 \\ 3 \overline{)92.4} \\ \underline{9} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

You could also have solved this problem by writing and solving a proportion.  $\frac{92.4}{3} = \frac{x}{1}$ ;  $92.4 \times 1 \div 3 = 30.8$  liters

**Note:** A common mistake when solving metric problems is putting the decimal point in the wrong place. To avoid errors, estimate before you work the problem. Compare your answer to the estimate.

## MEASUREMENT ► PRACTICE 2.2

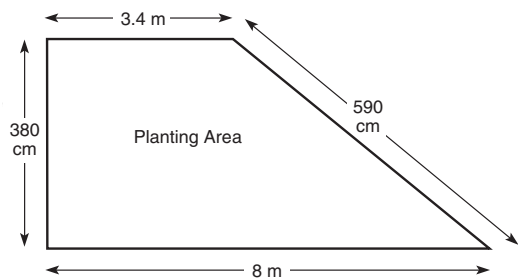
A. Solve as directed. You **MAY** use a calculator. Pay special attention to the label given for each answer.

- $5.4 \text{ cm} + 19 \text{ cm} + 2.85 \text{ cm} = \underline{\hspace{2cm}} \text{ cm}$
- $12 \text{ kg} + 10.5 \text{ kg} + 120 \text{ g} = \underline{\hspace{2cm}} \text{ g}$
- $2.4 \text{ m} + 150 \text{ cm} + 4.28 \text{ m} = \underline{\hspace{2cm}} \text{ m}$
- $2 \text{ l} - 1.4 \text{ l} = \underline{\hspace{2cm}} \text{ l}$
- $2.4 \text{ kg} - 180 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$
- $3.5 \text{ km} - 370 \text{ m} = \underline{\hspace{2cm}} \text{ m}$
- $4.3 \text{ cl} \times 30 = \underline{\hspace{2cm}} \text{ cl}$
- $1.6 \text{ mm} \times 15 = \underline{\hspace{2cm}} \text{ cm}$
- $150 \text{ g} \times 250 = \underline{\hspace{2cm}} \text{ kg}$
- $16 \text{ g} \div 64 = \underline{\hspace{2cm}} \text{ g}$
- $25.8 \text{ m} \div 4 = \underline{\hspace{2cm}} \text{ cm}$
- $3 \text{ kl} \div 15 = \underline{\hspace{2cm}} \text{ l}$

B. Choose the **one best answer** to each question. You may use a calculator.

Question 13 refers to the following diagram.

Russ has been asked to landscape the following area with drought-resistant plants.



- Russ decides to edge the entire planting area with cedar. What is the distance in meters around the planting area?
  - 10.84
  - 12.37
  - 21.1
  - 123.70
  - 211
- To make a carbonated punch, Kay Lynn adds six cans of club soda to 2 liters of cranberry juice. If each can holds 355 ml, how many liters of punch has Kay Lynn made?
  - 4.13
  - 4.26
  - 5.55
  - 23.3
  - 37.5
- A type of bonding gel comes in a small container that holds 4 g of the gel. How many of the small containers could be filled from 2.5 kg of the gel?
  - 6250
  - 625
  - 62
  - 6
  - Not enough information is given.
- Sharon buys 4.8 meters of ribbon to use as trim on a set of kitchen curtains. She actually uses 350 centimeters. How many centimeters of the ribbon are left?
  - 13
  - 44.5
  - 130
  - 302
  - 476.5
- A map scale reads 1 cm = 3.6 km. If the distance between two cities on the map is 4.2 centimeters, what is the actual distance between the cities in kilometers?
  - 0.6
  - 1.17
  - 7.8
  - 12.6
  - 15.12

**Answers and explanations begin on page 674.**

## MEASUREMENT

## Using a Calculator

**Key Ideas**

- If a measurement has more than one unit of measure, convert it to one unit before entering it on the calculator.
- Use fractions or decimals to represent smaller units.

**GED TIP**

Since measurement conversions are time-consuming, choose the method of working the problem that requires the fewest conversions.

**Entering Measurements on a Calculator**

Most calculators, including the one you will use on the GED Math Test, cannot process a measurement written with more than one unit label. For example, before you can enter the measurement 3 lb 8 oz, you must write it with only one label, either pounds or ounces.

There are several ways to do this quickly.

- **Enter the measurement as a decimal:** You know that 8 ounces =  $\frac{1}{2}$  pound, and the fraction  $\frac{1}{2} = 0.5$ . Therefore, 3 lb 8 oz equals 3.5 pounds.
- **Enter the measurement as a mixed number:** The number of pounds is the whole number part of the mixed number, and the number of ounces is the numerator of a fraction with a denominator of 16 (the number of ounces in a pound). 3 lb 8 oz equals  $3\frac{8}{16}$  lb. It isn't necessary to reduce the fraction before entering it into the calculator.
- **Enter the measurement in terms of the smaller label:** Since there are 16 ounces in 1 pound, 3 pounds equals  $3 \times 16$ , or 48 ounces. Add the remaining 8 ounces.  $48 + 8 = 56$  ounces

Try each method to solve the problem in the following example.

**Example:** Janira is replacing the floor molding on two walls of a room. She needs one piece measuring 15 feet 9 inches and one measuring 13 feet 6 inches. How many feet of molding does Janira need?

**Enter the measurements as decimals:**

9 inches is  $\frac{3}{4}$  or 0.75 ft, and 6 inches is  $\frac{1}{2}$  or 0.5 ft.

Enter: 15.75  $+$  13.5  $=$  29.25

**Enter as mixed numbers:**

Enter: 15  $\frac{3}{4}$  9  $\frac{3}{4}$  12  $+$  13  $\frac{1}{2}$  6  $\frac{1}{2}$  12  $=$  29  $\frac{1}{4}$

**Enter using the smallest unit of measure:**

Since 1 ft = 12 in, multiply the feet in each measurement by 12.

Enter: 15  $\times$  12  $+$  9  $+$  13  $\times$  12  $+$  6  $=$  351

Change to feet.  $351 \div 12 = 29.25$

Janira needs **29.25 feet**, or  **$29\frac{1}{4}$  feet**, of molding. Since  $\frac{1}{4}$  of 12 inches is 3 inches, you can also write the answer as 29 ft 3 in.

Which method do you prefer? The first method, entering the measurements as decimals, is probably the best method for most circumstances. To use this method, you need to have memorized the common fraction/decimal equivalencies on page 384.

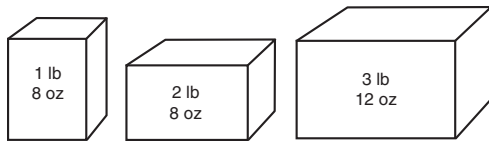
## MEASUREMENT ► PRACTICE 3

A. Solve as directed using a calculator.

- $3 \text{ lb } 8 \text{ oz} + 2 \text{ lb } 4 \text{ oz} = \underline{\hspace{2cm}} \text{ lb}$
- $2 \text{ c } 6 \text{ fl oz} + 1 \text{ c } 12 \text{ fl oz} = \underline{\hspace{2cm}} \text{ fl oz}$
- $3 \text{ min } 15 \text{ sec} - 2 \text{ min } 45 \text{ sec} = \underline{\hspace{2cm}} \text{ sec}$
- $4.5 \text{ l} - 350 \text{ cl} = \underline{\hspace{2cm}} \text{ cl}$
- $\frac{3}{4} \text{ mi} + 2640 \text{ ft} = \underline{\hspace{2cm}} \text{ mi}$
- $10 \text{ oz} \times 30 = \underline{\hspace{2cm}} \text{ lb}$
- $2.76 \text{ km} \div 3 = \underline{\hspace{2cm}} \text{ m}$
- $4 \text{ ft } 9 \text{ in} + 2 \text{ ft } 6 \text{ in} + 8 \text{ ft } 4 \text{ in} = \underline{\hspace{2cm}} \text{ ft } \underline{\hspace{2cm}} \text{ in}$
- $15 \text{ lb } 4 \text{ oz} - 9 \text{ lb } 8 \text{ oz} = \underline{\hspace{2cm}} \text{ oz}$
- $55 \text{ cm} \times 20 = \underline{\hspace{2cm}} \text{ m}$
- $3 \text{ yd } 2 \text{ ft } 9 \text{ in} \times 4 = \underline{\hspace{2cm}} \text{ yd } \underline{\hspace{2cm}} \text{ ft}$
- $2 \text{ m} + 30 \text{ cm} + 35 \text{ mm} = \underline{\hspace{2cm}} \text{ m}$
- $3 \text{ gal } 3 \text{ qt} \div 5 = \underline{\hspace{2cm}} \text{ qt}$
- $2.5 \text{ tons} - 1500 \text{ lb} = \underline{\hspace{2cm}} \text{ lb}$
- $15 \text{ g} \div 100 = \underline{\hspace{2cm}} \text{ mg}$
- $2 \text{ min } 30 \text{ sec} \times 30 = \underline{\hspace{2cm}} \text{ hr } \underline{\hspace{2cm}} \text{ min}$
- $4 \text{ pints} \div 8 = \underline{\hspace{2cm}} \text{ fl oz}$
- $600 \text{ mg} \times 120 = \underline{\hspace{2cm}} \text{ g}$
- $100 \text{ yd} \div 150 = \underline{\hspace{2cm}} \text{ ft}$
- $4 \text{ gal} - 12 \text{ pt} = \underline{\hspace{2cm}} \text{ pt}$

B. Choose the one best answer to each question. You MAY use a calculator.

Question 21 refers to the following information.



21. What is the combined weight, in ounces, of the three packages shown in the drawing?

- 7.75
- 96
- 123.52
- 124
- 544

22. At a restaurant, a kettle holds  $1\frac{3}{4}$  gallons of soup. If a soup bowl holds  $1\frac{3}{4}$  cups of soup, how many bowls can be filled from the soup in the kettle?

- 80
- 32
- 16
- 8
- Not enough information is given.

23. A pediatrician estimates that she spends an average of 14 minutes with each patient. Which of the following is the best estimate of how many patients the doctor could see in a 40-hour time period?

- 20
- 170
- 210
- 230
- 560

Answers and explanations begin on page 674.

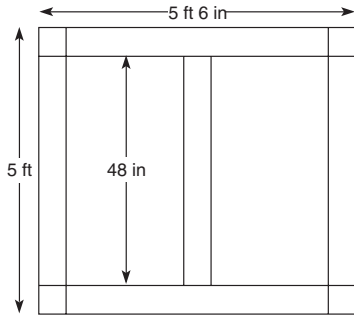


# MEASUREMENT PRACTICE QUESTIONS

## PART I

**Directions:** Choose the one best answer to each question. You MAY use a calculator.

Questions 1 and 2 refer to the following diagram.



1. James is building a steel platform. The diagram shows the measurements of the frame for the platform. How many feet of pipe will James need to build the frame?

- (1)  $14\frac{1}{2}$
- (2) 20
- (3) 21
- (4) 25
- (5) 29

2. The factory buys the pipe in 20-foot lengths. How many lengths measuring 48 inches can be cut from one 20-foot pipe?

- (1) 6
- (2) 5
- (3) 4
- (4) 3
- (5) 2

3. Carla runs a commercial cleaning business. She uses  $1\frac{1}{2}$  gallons of industrial-strength cleaner from a full container. If the capacity of the container is 5 gallons, how many quarts of cleaner are left in the container?

- (1)  $1\frac{1}{2}$
- (2)  $3\frac{1}{2}$
- (3) 5
- (4) 14
- (5) 20

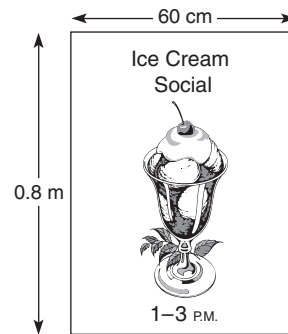
4. Rosanne needs to ship five promotional packages, each weighing 1 lb 9 oz. What is the total weight of the shipment?

- (1) 5 lb
- (2) 5 lb 13 oz
- (3) 7 lb 13 oz
- (4) 8 lb
- (5) 10 lb 5 oz

5. On Monday, Malcolm spent 3 hours 15 minutes updating patient files. On Tuesday, he spent 1 hour 30 minutes at the same task. If Malcolm spent 6 hours updating patient files last week, how many more hours did he spend on the task last week than this week?

- (1) 6
- (2)  $4\frac{3}{4}$
- (3)  $3\frac{1}{4}$
- (4)  $1\frac{1}{2}$
- (5)  $1\frac{1}{4}$

Question 6 refers to the following drawing.



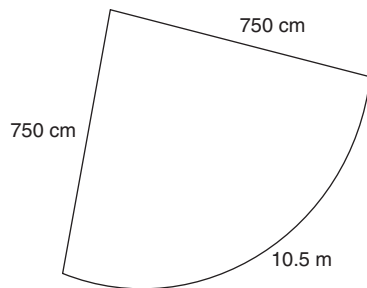
6. A nursing home aide is creating a display to encourage participation in activities. The measurements of the display are shown in the diagram. What is the height of the display in centimeters?

- (1) 0.008
- (2) 0.8
- (3) 80
- (4) 800
- (5) 8000

7. A can of olive oil holds 3000 ml. How many liters of oil does the can hold?
- (1) 0.003  
 (2) 0.3  
 (3) 3.0  
 (4) 30.0  
 (5) 300.0
8. In a vitamin supplement, each capsule contains 1000 milligrams of vitamins. How many *grams* of vitamins are found in each capsule?
- (1) 1000  
 (2) 100  
 (3) 10  
 (4) 1  
 (5) 0.1

Question 9 refers to the following diagram.

Carter has been hired to install edging around the area shown below.



9. What is the distance in *meters* around the planting area?
- (1) 10.5  
 (2) 12.0  
 (3) 25.5  
 (4) 1510.0  
 (5) 1605.0
10. A punch recipe calls for 2 liters of club soda and 1 liter of pineapple juice. How many glasses of punch will the recipe make?
- (1) 10  
 (2) 20  
 (3) 30  
 (4) 40  
 (5) Not enough information is given.

11. A tube of toothpaste holds 170 grams of paste. If approximately 1500 milligrams are used at each brushing, about how many brushings can a person get from the tube of toothpaste?
- (1) 10,000  
 (2) 1,000  
 (3) 100  
 (4) 10  
 (5) Not enough information is given.
12. Aaron buys a roll of plastic sheeting that is 5 meters long. If he uses 3.5 meters, how many centimeters of the plastic are left?
- (1) 1.5  
 (2) 15  
 (3) 150  
 (4) 350  
 (5) 500

13. What is the combined weight in kilograms of packages weighing 15.8 kg, 13.5 kg, and 19.3 kg?

Mark your answer in the circles on the grid at the bottom of the page.

14. A coffee café brews 5 gallons of coffee at a time. How many 8-ounce cups could the café fill using the 5 gallons?

Mark your answer in the circles on the grid at the bottom of the page.

13.

	/	/	/		
.	.	.	.	.	.
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

14.

	/	/	/		
.	.	.	.	.	.
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

Questions 15 through 17 refer to the following information.

Humidifier
11 quart capacity
width: 27 in
height: 24 in
depth: 18 in
Model Number: RQ481

15. Elizabeth bought the humidifier described above. Which of the following expressions could she use to find the capacity of the humidifier in gallons?

- (1)  $11 \times 2$
- (2)  $\frac{11}{2}$
- (3)  $11 \times 4$
- (4)  $\frac{11}{4}$
- (5)  $11 \times 8$

16. Which of these measurements is the minimum amount of space needed for the width of the humidifier?

- (1) 2 ft 1 in
- (2) 2 ft 3 in
- (3)  $2\frac{1}{3}$  ft
- (4)  $2\frac{1}{2}$  ft
- (5) 2 ft 7 in

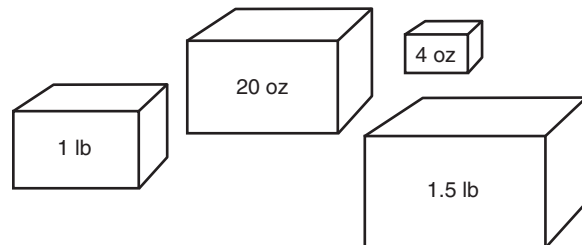
17. If the humidifier is guaranteed to run 270 minutes without refilling, how many hours will it run before Elizabeth needs to refill it?

- (1) 4
- (2)  $4\frac{1}{2}$
- (3) 60
- (4) 90
- (5) Not enough information is given.

18. A map scale reads 1 in = 50 mi. If the distance between two cities on the map is  $3\frac{1}{2}$  inches, what is the actual distance between the cities in miles?

- (1) 2.5
- (2) 25
- (3) 50
- (4) 150
- (5) 175

Question 19 refers to the following information.



19. What is the combined weight, in ounces, of the four packages shown in the drawing?

- (1) 4
- (2) 26.5
- (3) 49
- (4) 64
- (5) 128

20. At a restaurant, a can contains  $2\frac{1}{2}$  gallons of spaghetti sauce. If the cook uses about 5 cups of sauce per hour when cooking, how many cooking hours will 1 can of sauce last?

- (1) 40
- (2) 10
- (3) 8
- (4) 7.5
- (5) Not enough information is given.

21. A veterinarian estimates that she spends an average of 20 minutes with each patient. Which of the following is the best estimate of how many patients the doctor could see if she spends 33 hours a week on office visits?

- (1) 20
- (2) 33
- (3) 60
- (4) 99
- (5) 660

22. Jan weighs a little more than 160 pounds. During a routine checkup, she sees her current weight is recorded as 74. What unit of measure did the nurse most likely use to record Jan's weight?

- (1) ounces
- (2) milligrams
- (3) meters
- (4) grams
- (5) kilograms

23. A standard sheet of paper measures about 28 units on a ruler. What unit of measure is being used?

- (1) inches
- (2) feet
- (3) millimeters
- (4) centimeters
- (5) meters

24. A soup recipe calls for 45 ounces of kidney beans and 30 ounces of navy beans. If 1 can contains 15 ounces of beans, which expression shows how many cans of beans are needed for this recipe?

- (1)  $\frac{(45 + 30)}{15}$
- (2)  $45 \times \frac{30}{15}$
- (3)  $45 + 30$
- (4)  $\frac{45}{15}$
- (5)  $\frac{30}{15}$

25. A can of frozen lemonade concentrate has the following label.

**Lemonade Concentrate**  
 Contents: 9 fl oz (260 ml)  
 To Serve: Mix with  $4\frac{1}{2}$  cups of cold water. Stir.

Andrew mixes two cans of the frozen concentrate with the appropriate amount of water. How much lemonade has he made?

- (1) 90 fl oz
- (2) 90 c
- (3) 90 ml
- (4) 9.0 pt
- (5) 9.0 qt

26. How many inches are in 4 feet?

Mark your answer in the circles on the grid at the bottom of the page.

27. Marco goes on service calls. He spent  $2\frac{1}{2}$  hours on the first call, 45 minutes on the second call, and 70 minutes on the third call. How many minutes did he spend in all on the 3 service calls?

Mark your answer in the circles on the grid at the bottom of the page.

26. 

	7	7	7	
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

27. 

	7	7	7	
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

**Answers and explanations begin on page 674.**

# DECIMALS AND FRACTIONS PRACTICE QUESTIONS

## PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

- A wooden flooring strip is  $20\frac{1}{2}$  inches long. If you cut off  $4\frac{3}{4}$  inches from one end, what will be the new length of the strip in inches?
  - $\frac{1}{2}$
  - $16\frac{3}{4}$
  - $16\frac{1}{4}$
  - $15\frac{3}{4}$
  - $15\frac{1}{4}$
- A box of cereal costs \$4.69. The package label says that the box contains 19 servings. What is the cost of 1 serving to the nearest cent?
  - \$0.02
  - \$0.25
  - \$0.47
  - \$0.89
  - \$2.46
- How much would a computer system cost if it is priced as shown below?

**Pay \$200 down and make 12 monthly payments of only \$98.85.**

  - \$3586.20
  - \$2400.00
  - \$1386.20
  - \$1186.20
  - Not enough information is given.
- Unleaded gasoline sells for \$1.469 per gallon. How much would  $10\frac{1}{2}$  gallons cost? Round your answer to the nearest cent.
  - \$10.50
  - \$14.69
  - \$15.42
  - \$16.89
  - \$25.10
- Three packages weigh  $1\frac{1}{2}$  pounds,  $4\frac{3}{4}$  pounds, and  $2\frac{3}{10}$  pounds. What is the average weight, in pounds, of the packages? (*Hint:* Add the weights, then divide by the number of packages.)
  - 2.14
  - 2.85
  - 4.75
  - 8.55
  - Not enough information is given.
- Gina is paid \$8 an hour. If she earned \$258 in 1 week, how many hours did she work?
  - $34\frac{1}{2}$
  - $32\frac{1}{2}$
  - $32\frac{1}{3}$
  - $32\frac{1}{4}$
  - $32\frac{1}{5}$
- A developer plans to build homes on  $20\frac{1}{2}$  acres. She estimates that  $6\frac{1}{4}$  acres will be used for roads. The remaining land will be divided into  $\frac{1}{4}$ -acre lots. How many lots can the subdivision include?
  - 7
  - 31
  - 57
  - 81
  - 107
- A school buys 1000 white-board markers. Below is the price per marker for two brands. How much did the school save by buying Brand A instead of Brand B?

Brand A: \$0.27 each  
Brand B: \$0.36 each

  - \$0.09
  - \$0.90
  - \$9.00
  - \$90.00
  - \$900.00

Questions 9 and 10 refer to the following information.

Madison Small Animal Clinic Scheduling Guidelines	
New-Patient Appointment	$\frac{3}{4}$ hr
Immunizations	$\frac{1}{4}$ hr
Routine Physical	$\frac{1}{3}$ hr
Dental Scaling	$\frac{3}{4}$ hr
Sick Animal Visit	$\frac{1}{2}$ hr
Serious-Injury Visit (includes X rays)	$1\frac{1}{4}$ hr

9. Ray is a veterinarian at the small-animal clinic. He has four appointments scheduled for Monday morning: two new-patient appointments, a serious-injury visit, and a dental scaling. In hours, how much time should these appointments take?

- (1)  $2\frac{3}{4}$
- (2)  $3\frac{1}{2}$
- (3)  $3\frac{3}{4}$
- (4) 4
- (5)  $5\frac{1}{2}$

10. Jennifer works  $3\frac{1}{2}$  hours each morning at the clinic. How many routine physicals could she complete in one morning?

- (1) 1
- (2) 4
- (3) 9
- (4) 10
- (5) 11

11. A minor-league baseball stadium has 6000 seats. On Beach Towel Night, the stadium sold 5500 of its available seats. What fraction of the seats were sold?

- (1)  $\frac{5}{6}$
- (2)  $\frac{7}{8}$
- (3)  $\frac{8}{9}$
- (4)  $\frac{9}{10}$
- (5)  $\frac{11}{12}$

12. The City Center parking garage charges \$3.50 for the first hour and \$1.25 for each additional  $\frac{1}{2}$  hour. How much would it cost to park at the garage for  $2\frac{1}{2}$  hours?

- (1) \$4.75
- (2) \$6.25
- (3) \$7.25
- (4) \$8.75
- (5) \$12.25

13. Susan scheduled 84 appointments for patients at a hospital outreach clinic. Only 56 patients kept their appointments. What fraction of the scheduled appointments were kept?

Mark your answer in the circles on the grid at the bottom of the page.

14. This portion of a gas bill compares a household's natural gas usage for December of this year and last year.

Gas Bill Comparison Average Daily Usage			
This Year		Last Year	
Dec	3.13 therms	Dec	3.97 therms

How many more therms of natural gas did the household use in December of last year than December of this year?

Mark your answer in the circles on the grid at the bottom of the page.

13.

	/	/	/	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

14.

	/	/	/	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

15. Jim and Carl have until 1 P.M. to load 250 boxes. By 12:30 P.M., 175 of the boxes are loaded. What fraction of the boxes has not been loaded?

- (1)  $\frac{1}{5}$
- (2)  $\frac{3}{10}$
- (3)  $\frac{3}{5}$
- (4)  $\frac{7}{10}$
- (5) Not enough information is given.

16. Kim has two jobs. She earns \$8.90 per hour as a landscaping assistant and \$7.50 per hour as a clerk at a clothing store. In one week, she works 12 hours at her landscaping job and 15 hours at the clothing store. Which of the following expressions could be used to find her earnings for the week?

- (1)  $(12 \times 15) + (\$8.90 + \$7.50)$
- (2)  $27 \times \$8.90 \times \$7.50$
- (3)  $(15 \times \$8.90) + (12 \times \$7.50)$
- (4)  $(12 + 15) \times (\$8.90 + \$7.50)$
- (5)  $(12 \times \$8.90) + (15 \times \$7.50)$

17. Scott is driving about 380 miles from Los Angeles to San Francisco. He plans to cover  $\frac{3}{4}$  of the distance before noon. How many miles does he plan to drive before noon?

- (1) 285
- (2) 254
- (3) 126
- (4) 95
- (5) 32

18. A cookie recipe calls for  $1\frac{2}{3}$  cups of sugar. If you wanted to make half the quantity shown in the recipe, how many cups of sugar would you use?

- (1)  $\frac{2}{5}$
- (2)  $\frac{2}{3}$
- (3)  $\frac{3}{4}$
- (4)  $\frac{5}{6}$
- (5)  $1\frac{1}{6}$

19. Which of the following shows the drill bits arranged in order from least to greatest in size?

Carbide Steel Drill Bits		
Description	Size (inches)	Price
Cutter	$\frac{9}{16}$	\$6.19
Core Box	$\frac{5}{32}$	\$16.40
Classic	$\frac{3}{8}$	\$17.85
Bevel	$\frac{1}{2}$	\$10.50

- (1) cutter, bevel, classic, core box
- (2) core box, bevel, classic, cutter
- (3) core box, cutter, classic, bevel
- (4) bevel, classic, cutter, core box
- (5) core box, classic, bevel, cutter

20. A cable installer cuts two 12.75-foot lengths of coaxial cable from a 50-foot length of cable. Which of the following expressions could be used to find out how many feet of cable are left?

- (1)  $12.75 + 12.75 - 50$
- (2)  $50 - (2 \times 12.75)$
- (3)  $50 - 2 - 12.75$
- (4)  $2(50 - 12.75)$
- (5)  $50 - 12.75$

21. A project should take no more than 60 hours. If John can spare 7.5 hours per day to work on the project, how many workdays should it take him to finish?

- (1) 5
- (2) 6
- (3) 7
- (4) 8
- (5) 9

22. How many miles would a map distance of  $\frac{5}{8}$  inch represent if 1 in = 240 mi?

- (1) 40
- (2) 90
- (3) 130
- (4) 150
- (5) 200



23. A survey shows that  $\frac{2}{3}$  of all homeowners have a pet. Of those,  $\frac{3}{4}$  have either a dog or cat. Of the homeowners surveyed, what fraction has either a dog or a cat?

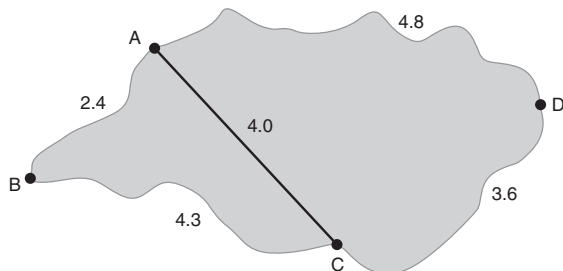
- (1)  $\frac{5}{12}$
- (2)  $\frac{1}{2}$
- (3)  $\frac{3}{4}$
- (4)  $\frac{5}{7}$
- (5)  $\frac{6}{7}$

24. At Wyman Shipping, 140 employees work during the day shift. At night, the crew is  $\frac{2}{5}$  the size of the day shift. How many workers are scheduled to work the night shift?

- (1) 28
- (2) 56
- (3) 70
- (4) 94
- (5) 98

Question 25 refers to the following map.

The map below shows the distance, in miles, between four stores.



25. Maya drives a van that delivers supplies to each of the stores. On Friday, she traveled the following route.

- Store A to Store B
- Store B to Store C
- Store C to Store D
- Store D to Store C
- Store C to Store A

How many miles did she drive in all?

- (1) 13.9
- (2) 14.3
- (3) 15.1
- (4) 17.9
- (5) 19.1

26. From a wooden dowel  $12\frac{1}{2}$  feet long, Jamie cut two pieces, each  $3\frac{3}{4}$  feet long. How long, in feet, is the remaining piece?

- (1)  $9\frac{1}{2}$
- (2)  $8\frac{3}{4}$
- (3)  $7\frac{1}{2}$
- (4)  $6\frac{1}{2}$
- (5) 5

27. Luis bought 20 shares of stock, priced at \$26.38 per share. He also paid an \$8 transaction fee. How much did he pay?

- (1) \$687.60
- (2) \$535.60
- (3) \$527.60
- (4) \$519.60
- (5) \$54.38

28. A mat board is 60 inches wide. How many strips measuring 0.75 inch wide can be cut from the board? (Assume no waste from the cuts.)

Mark your answer in the circles on the grid at the bottom of the page.

29. Of his take-home pay each month, Jerry spends  $\frac{1}{6}$  on a car payment and  $\frac{1}{4}$  on food. What fraction of his take-home pay is left after paying for these two items?

Mark your answer in the circles on the grid at the bottom of the page.

28.

	0	0	0	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

29.

	0	0	0	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Answers and explanations begin on page 667.



## GEOMETRY

## Circles

**Key Ideas**

- On the GED Math Test, pi ( $\pi$ )  $\approx$  3.14.
- To find circumference, multiply pi by the diameter (distance across) the circle.
- The radius is the distance from the center to the edge of the circle. To find area, multiply pi by the square of the radius.

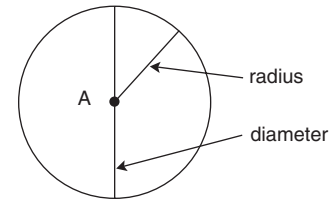
**GED TIP**

To estimate the area or circumference of a circle, use 3 for pi. You may be able to eliminate most incorrect answer choices using only an estimate. Estimating is also a good way to check your work.

**Circumference and Area**

A **circle** is a closed set of points that are all the same distance from a single point, the center of the circle. The **circumference** of a circle is its perimeter, or the distance around the circle. The area of a circle is the space inside the circle.

To find perimeter and area of a circle, you need to know two other measures of a circle. The **diameter** is a line segment with endpoints on the circle that passes through the center of the circle. The **radius** is a line segment that connects the center of the circle to any point on the circle. As you can see from the diagram, the radius is one-half the diameter.



The formulas for circumference and area use a special quantity called **pi** ( $\pi$ ). Pi is the ratio of the circumference to the diameter. If you push the pi key on a scientific calculator, the display will show a long string of digits beginning with 3.14. As far as we know, the digits for pi continue infinitely, so calculations with pi are always approximations. For the GED Math Test, you will use 3.14 as the value of pi. Below is the formula for finding the circumference of a circle.

$$\text{Circumference} = \pi \times \text{diameter, or } C = \pi d$$

**Example 1:** A china plate has a gold rim. If the plate's diameter is 10.5 inches, what is the distance around the rim to the nearest tenth of an inch?

$$\begin{aligned} \text{Use the formula: } C &= \pi d \\ &= 3.14(10.5) \\ &= 32.97, \text{ which rounds to } \mathbf{33.0 \text{ inches}} \end{aligned}$$

Use this formula to find the area of a circle: Area =  $\pi \times \text{radius}^2$ , or  $A = \pi r^2$ .

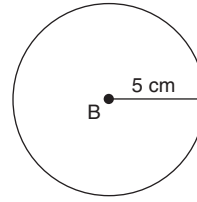
**Example 2:** The circular surface of a satellite component must be covered with heat-resistant tiles. If the radius of the component is 4 meters, what is the area in square meters?

$$\begin{aligned} \text{Use the formula: } A &= \pi r^2 \\ &= 3.14(4^2) \\ &= 3.14(16) \\ &= \mathbf{50.24 \text{ square meters}} \end{aligned}$$

In some situations, you may need to solve for either the diameter or radius. Remember, the diameter is twice the radius ( $d = 2r$ ), and the radius is one-half the diameter:  $r = \frac{1}{2}d$ .

**Example 3:** What is the circumference of circle *B* to the nearest tenth of a centimeter?

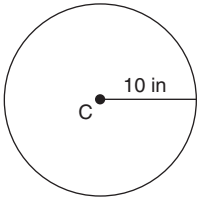
- The radius of the circle is 5 cm. Therefore, the diameter is  $2 \times 5$ , or 10 cm.
- Use the formula:  $C = \pi d$   
 $= 3.14(10)$   
 $= 31.4 \text{ cm}$



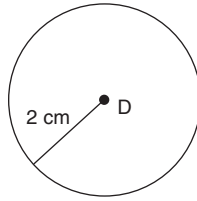
## GEOMETRY ► PRACTICE 8

**A. Find the circumference and area of each circle. Round answers to the nearest tenth.**

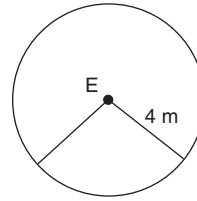
1.



2.

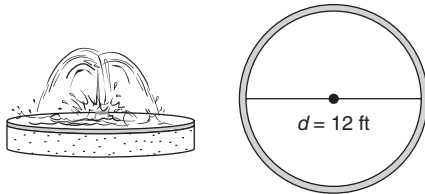


3.



**B. Choose the one best answer to each question.**

Questions 4 and 5 refer to the following drawing.



4. If workers lay a tile border around the edge of the fountain shown in the diagram, how many feet long will the border be to the nearest foot?

- 19
- 36
- 38
- 57
- 113

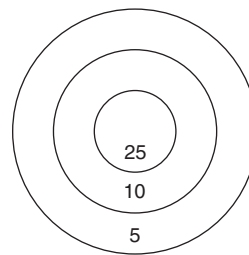
5. Which of the following expressions could be used to find the area of the bottom surface of the fountain?

- $3.14 \times 6$
- $3.14 \times 6^2$
- $3.14 \times 12$
- $3.14 \times 12^2$
- Not enough information is given.

6. The radius of a circle is 6.5 cm. What is the diameter of the circle in centimeters?

- 3.25
- 13.0
- 33.16625
- 40.82
- 132.665

7. On the target below, the 5- and 10-point bands are each 2 inches wide, and the inner circle has a diameter of 2 inches.



To the nearest inch, what is the outer circumference of the 10-point band?

- 6
- 13
- 19
- 113
- Not enough information is given.

**Answers and explanations begin on page 683.**

## GEOMETRY

## Volume

**Key Ideas**

- Volume is measured in cubic units that may be written using an exponent: 6 cubic inches or  $6 \text{ in}^3$ .
- Find volume by multiplying the area of one base by the height of the object.
- You can also use formulas to find volume.

**GED TIP**

Learn which area formula goes with which shape. Once you know the area formulas, you can change them to volume by putting an  $h$  at the end. Compare:

Area of circle:  $\pi r^2$

Volume of circle:  $\pi r^2 h$

**Rectangular Solids, Cubes, and Cylinders**

**Volume**, also called **capacity**, is the measure of space inside a three-dimensional object. You measure volume in cubic units. In other words, if the sides of an object are measured in inches, the volume is the number of cubes (one inch per side) you would need to fill the object.

Many common three-dimensional objects have at least two identical and parallel faces. Think of a cereal box or a soup can. Both objects have identical faces at the top and bottom of the container. Either of these faces can be called the base of the object. To find the volume of any container with identical bases, multiply the area of one base by the height of the object:  
 Volume = Area of base  $\times$  height.

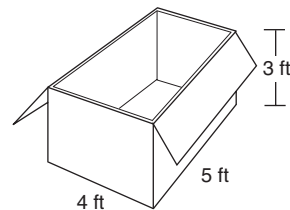
Another way to find the volume of an object is to use the formula that applies specifically to that object. On the GED formulas page (see page 688), you will be given the following volume formulas:

<b>rectangular solid</b>	Volume = length $\times$ width $\times$ height	$V = lwh$
<b>cube</b>	Volume = edge <sup>3</sup>	$V = e^3$
<b>cylinder</b>	Volume = pi $\times$ radius <sup>2</sup> $\times$ height	$V = \pi r^2 h$

In the examples below, formulas are used to find the answers, but the problems can also be solved by simply multiplying the area of the base by the height.

A **rectangular solid** has two identical rectangular bases. The remaining sides of the solid are also rectangles.

**Example 1:** A cardboard box has the dimensions shown in the diagram. What is the volume of the box in cubic feet?



Use the formula:  $V = lwh$

$$= 5(4)(3) = \mathbf{60 \text{ cubic feet}}$$

A **cube** is a rectangular solid with six identical faces. In a cube, each edge (where the sides meet) is the same length.

**Example 2:** A wood block measures 2 inches per edge. What is the volume of the block?



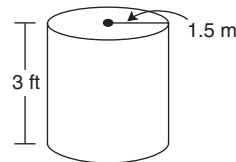
Use the formula:  $V = e^3$

$$= 2^3 = \mathbf{8 \text{ cubic feet}}$$

A **cylinder** has two circular bases. The bases are connected by a curved surface. Cans, barrels, and tanks are often in the shape of cylinders.

**Example 3:** A storage tank has a radius of 1.5 meters. What is the volume of the tank to the nearest cubic meter?

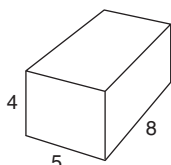
Use the formula:  $V = \pi r^2 h$   
 $= 3.14(1.5^2)(3) = 21.195 \text{ m}^3$ ,  
 which rounds to **21 cubic meters**



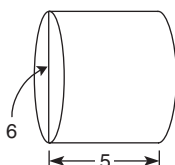
## GEOMETRY ► PRACTICE 9.1

**A. Find the volume of each object to the nearest whole unit.**

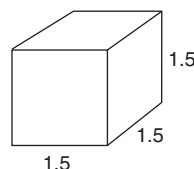
1.



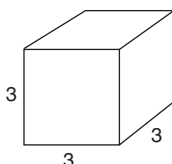
3.



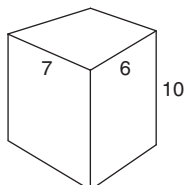
5.



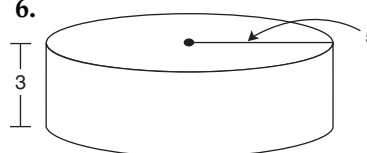
2.



4.

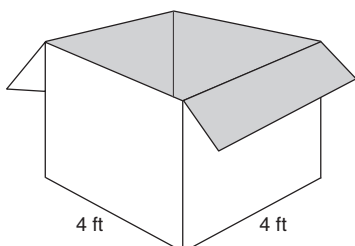


6.



**B. Choose the one best answer to each question.**

Question 7 refers to the following drawing.



7. A rectangular box with a volume of 80 cubic feet has the length and width shown in the drawing. What is the height of the box?

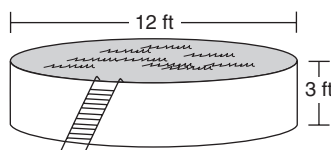
- (1) 5
- (2) 10
- (3) 16
- (4) 20
- (5) Not enough information is given.

8. A wooden crate measures 5 feet along each edge. What is the crate's volume in cubic feet?

- (1) 15
- (2) 25
- (3) 125
- (4) 150
- (5) Not enough information is given.

Question 9 refers to the following drawing.

9. Linda adds a water stabilizer to her children's swimming pool once a week. The instructions tell her to add one scoop of the product for every 20 cubic feet of water. About how many scoops should she add per week?



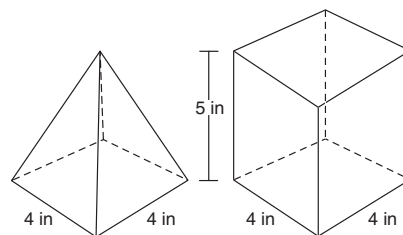
- (1) 2
- (2) 3
- (3) 6
- (4) 17
- (5) 36

**Answers and explanations begin on page 684.**

## Volume of Pyramids and Cones

A **pyramid** is a three-dimensional object with three triangle faces that connect to the same vertex. The base of a pyramid can be any closed figure, but the pyramids that you will see on the GED Math Test will all have square bases.

The rectangular solid and the pyramid shown here both have identical square bases and the same height. Compare the two figures. As you can see, the pyramid holds much less than the rectangular solid. In fact, it holds only one-third of the rectangular solid's volume.



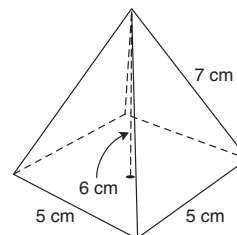
On the GED formulas page (see page 688), the formula for finding the volume of a pyramid is as written below. Notice that  $(\text{base edge})^2$  equals the area of the square base. The height of a pyramid is the perpendicular distance from the base to the vertex at the top.

**square pyramid**      Volume =  $\frac{1}{3} \times (\text{base edge})^2 \times \text{height}$

**Example 1:** Find the volume of the pyramid shown below.

The length of a base edge is 5 cm. The height of the pyramid is 6 cm. Ignore the diagonal edges.

$$\begin{aligned} \text{Apply the formula: } V &= \frac{1}{3}e^2h \\ &= \frac{1}{3}(5^2)(6) \\ &= \frac{1}{3}(25)(6) \\ &= \mathbf{50 \text{ cm}^3} \end{aligned}$$



A **cone** is similar to a cylinder. Both have a circular base and a curved side. The curved side of a cone slants inward so that it meets at a point, or vertex. The volume of a cone is  $\frac{1}{3}$  of the volume of a cylinder with the same size base and height.

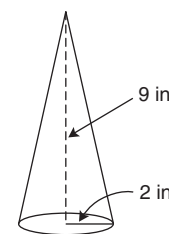
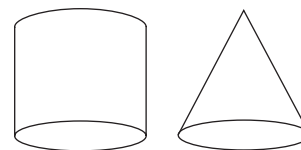
On the GED formulas page, the formula for volume of a cone is as follows. Notice that the formula contains the formula for finding the area of a circle ( $\pi r^2$ ).

**cone**      Volume =  $\frac{1}{3} \times \pi \times \text{radius}^2 \times \text{height}$

**Example 2:** Find the volume of the cone shown below.

The radius of the base is 2 inches, and the height is 9 inches.

$$\begin{aligned} \text{Apply the formula: } V &= \frac{1}{3}\pi r^2h \\ &= \frac{1}{3}(3.14)(2^2)(9) \\ &= \frac{1}{3}(3.14)(4)(9) \\ &= \mathbf{37.68 \text{ in}^3} \end{aligned}$$

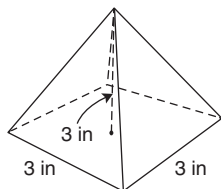


**Note:** In volume formulas for cones and square pyramids, the factor  $\frac{1}{3}$  is shown first. Don't begin with this factor. Multiply the other factors first and then divide by 3, unless the numbers are easily divided by 3.

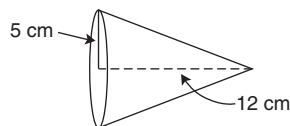
## GEOMETRY ► PRACTICE 9.2

### A. Find the volume of each object to the nearest unit.

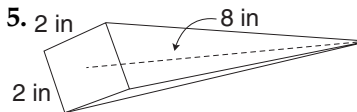
1.



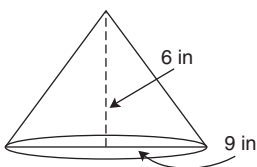
3.



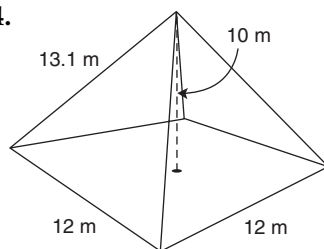
5.



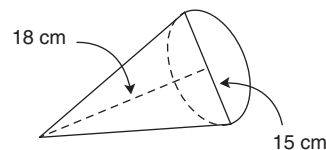
2.



4.

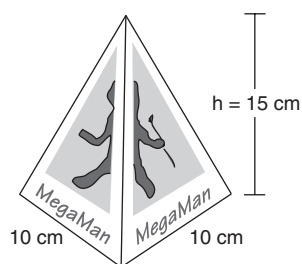


6.



### B. Choose the one best answer to each question.

7. Advertisers have designed this pyramid-shaped package to hold action figures.



After testing the design, the manufacturer decides to increase both the length and width of the base by 4 cm. How many more cubic centimeters will the new package hold than the package shown above?

- (1) 2940
- (2) 980
- (3) 500
- (4) 480
- (5) 96

8. The height of a cone is  $\frac{1}{2}$  the diameter of its base. If the cone's height is 4 inches, what is the cone's volume to the nearest cubic inch?

- (1) 21
- (2) 48
- (3) 67
- (4) 268
- (5) Not enough information is given.

9. Which of the following is a true statement about the figures shown below?

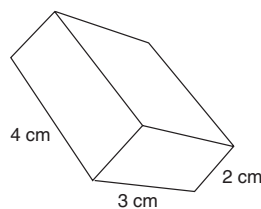


Figure A

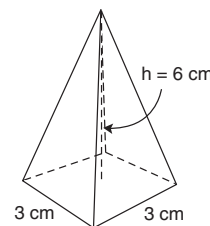


Figure B

- (1) The volume of A equals the volume of B.
- (2) The volume of B is greater than the volume of A.
- (3) The volume of A is twice as great as the volume of B.
- (4) Both A and B have a volume greater than 20 cubic centimeters.
- (5) The volume of B is less than the volume of A.

10. A cone's base is a circle with a radius of 8 inches. The cone's height is 15 inches. What is the cone's estimated volume in cubic inches?

- (1) 125
- (2) 250
- (3) 500
- (4) 1000
- (5) 4000

Answers and explanations begin on page 684.

## GEOMETRY

Irregular  
Figures**Key Ideas**

- Irregular figures are made from two or more regular figures.
- To find the perimeter of an irregular figure, add the lengths of all the sides.
- To find area or volume of an irregular figure, break the figure into parts, and find the area or volume of each part; then combine the results.

**GED TIP**

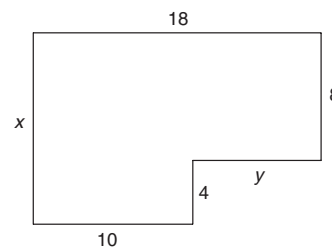
*There is usually more than one way to break down an irregular figure. Solve the problem the way that seems easiest to you. The answer will be the same.*

**Breaking Irregular Figures Into Parts**

An irregular figure combines geometric figures to form a new shape. To find the perimeter of an irregular figure, simply add the lengths of the sides. You may need to solve for one or more missing lengths.

**Example 1:** A family room has the dimensions shown in the diagram. All measures are in feet. What is the perimeter of the room?

1. Find the missing measures. Measurement  $x$  equals the combined lengths of the two opposite walls:  $x = 8 + 4 = 12$  ft. You also know that  $18 - 10 = y$ , so  $y = 8$  ft.



2. Add all distances to find the perimeter.  
 $12 + 18 + 8 + 8 + 4 + 10 = \mathbf{60 \text{ ft}}$

To find the area or volume of an irregular figure, break the figure into parts. Then apply the correct formula to each part.

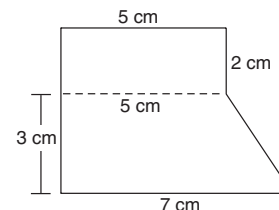
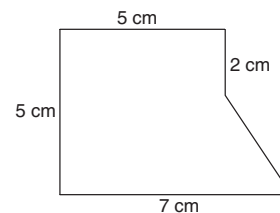
**Example 2:** What is the area of the figure in square centimeters?

1. Divide the figure into two shapes, and find any missing measurements. Here the figure is divided into a trapezoid and a rectangle.
2. Calculate the area of each shape.

$$\begin{aligned} \text{Rectangle: } A &= lw \\ &= 2(5) = 10 \text{ sq cm} \end{aligned}$$

$$\begin{aligned} \text{Trapezoid: } A &= \frac{1}{2}(b_1 + b_2)h \\ &= \frac{1}{2}(5 + 7)(3) = 18 \text{ sq cm} \end{aligned}$$

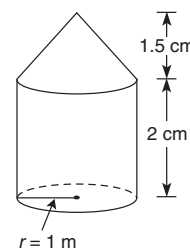
3. Combine.  $10 + 18 = \mathbf{28 \text{ sq cm}}$



**Example 3:** Find the volume of the container shown below.

Break the figure into a cylinder and a cone, and find the volume of each.

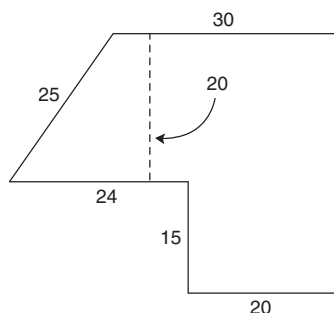
1. Cylinder:  $V = \pi r^2 h$   
 $= (3.14)(1^2)(2) = 6.28 \text{ m}^3$
2. Cone:  $V = \frac{1}{3}\pi r^2 h$   
 $= \frac{1}{3}(3.14)(1^2)(1.5) = 1.57 \text{ m}^3$
3. Combine.  $6.28 + 1.57 = \mathbf{7.85 \text{ m}^3}$  or  $\mathbf{7.85 \text{ cu m}}$



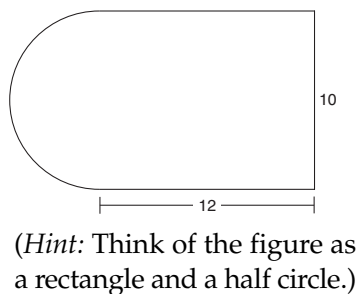
## GEOMETRY ► PRACTICE 10

A. Find the perimeter and area of each figure.

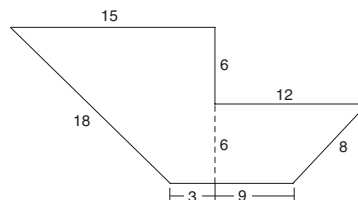
1.



2.

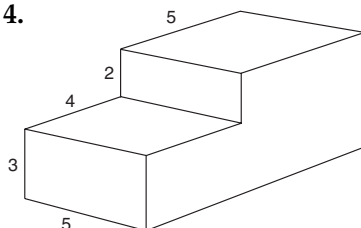


3.

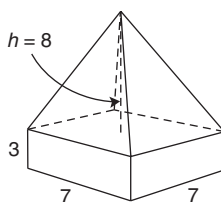


B. Find the volume of each figure to the nearest cubic unit.

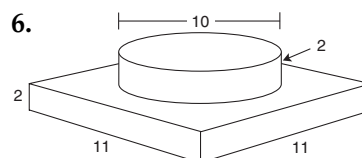
4.



5.

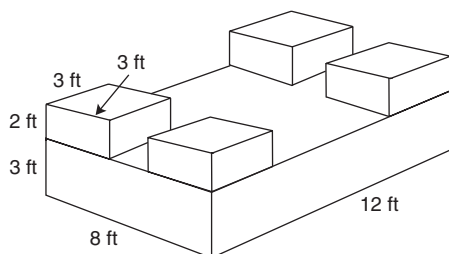


6.



C. Choose the **one best answer** to each question.

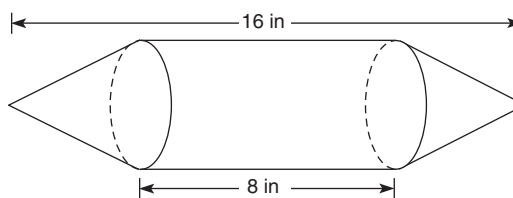
7. A slab of concrete will have four concrete blocks in each corner as shown in the drawing below.



If each corner block has the same dimensions, what is the volume of the structure in cubic feet?

- (1) 360
- (2) 288
- (3) 168
- (4) 72
- (5) Not enough information is given.

8. A candy package is in the shape of a cylinder with a cone on each end.



If the radius of the cylinder is 2 inches and the cones are identical, what is the capacity of the container to the nearest cubic inch?

- (1) 201
- (2) 134
- (3) 128
- (4) 100
- (5) 33

Answers and explanations begin on page 684.



## GEOMETRY

## Pythagorean Relationship

## Key Ideas

- The hypotenuse is the longest side of a right triangle. It is found opposite the right angle.
- The sum of the squares of the legs of a right triangle equals the square of the hypotenuse.

## GED TIP

Watch for triangles with sides in a 3-4-5 or 5-12-13 ratio. These triangles often appear on math tests because the measures of the sides are all whole numbers.

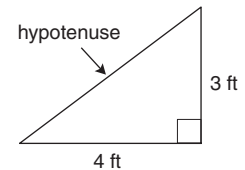
As you know, a right triangle has one right angle. The side directly across from the right angle, called the **hypotenuse**, is the longest side of the right triangle. The remaining sides, the rays of the right angle, are the **legs** of the triangle.

Thousands of years ago, people found a special relationship, called the **Pythagorean relationship**, among the sides of a right triangle. You can use this relationship to find the measure of any side of a right triangle if the other two side measures are known.

**Pythagorean relationship**  $a^2 + b^2 = c^2$ ;  $a$  and  $b$  are legs, and  $c$  the hypotenuse of a right triangle

In other words, the square of the hypotenuse is equal to the sum of the squares of the two legs of the right triangle.

**Example 1:** What is the length of the hypotenuse of the right triangle shown in the diagram?



1. The lengths of the legs are 3 ft and 4 ft. Let one leg equal  $a$  and the other equal  $b$ .

2. Solve for  $c$ . Substitute the values.

$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

3. When one side of an equation equals a squared variable, isolate the variable by finding the square root of both sides.

$$9 + 16 = c^2$$

$$25 = c^2$$

$$\sqrt{25} = c$$

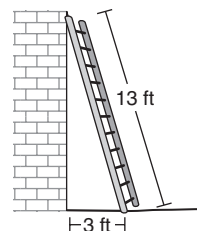
$$5 = c$$

The length of the hypotenuse is **5 feet**.

The Pythagorean relationship can also be used to solve for the length of a leg.

**Example 2:** If John places a 13-foot ladder 3 feet from the base of a wall, how far up the wall will the ladder reach to the nearest tenth foot?

The wall, ground, and ladder form a right triangle. The hypotenuse is 13 ft in length. One leg is 3 ft. You need to find the length of the other leg.



$$a^2 + b^2 = c^2$$

$$3^2 + b^2 = 13^2$$

$$9 + b^2 = 169$$

$$b^2 = 160$$

$$b = \sqrt{160}$$

$$b \approx 12.6$$

The ladder will extend **12.6 feet** up the wall. Note: Most of the time, you will need to use your calculator for the final step when using the Pythagorean relationship. To find the square root of 160 on the

Casio fx-260 calculator, press: 160 **(SHIFT)** **(x<sup>2</sup>)**.

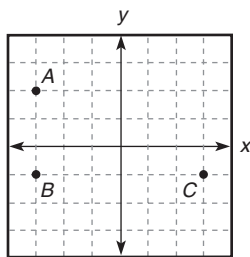
## GEOMETRY ► PRACTICE 11

A. The lengths of two sides of a right triangle are given. Find the length of the remaining side to the nearest tenth unit. You may use a calculator.

- |  |   |  |
|--|---|--|
| 1. leg $a$ : 8 in<br>leg $b$ : 8 in<br>hypotenuse $c$ : ? in   | 4. leg $a$ : ? m<br>leg $b$ : 3 m<br>hypotenuse $c$ : 6 m     | 7. leg $a$ : 7 cm<br>leg $b$ : 10 cm<br>hypotenuse $c$ : ? cm  |
| 2. leg $a$ : 9 yd<br>leg $b$ : 12 yd<br>hypotenuse $c$ : ? yd  | 5. leg $a$ : 6 mm<br>leg $b$ : ? mm<br>hypotenuse $c$ : 10 mm | 8. leg $a$ : 15 in<br>leg $b$ : ? in<br>hypotenuse $c$ : 30 in |
| 3. leg $a$ : 1.5 cm<br>leg $b$ : 2 cm<br>hypotenuse $c$ : ? cm | 6. leg $a$ : ? ft<br>leg $b$ : 5 ft<br>hypotenuse $c$ : 18 ft | 9. leg $a$ : 4 km<br>leg $b$ : 5 km<br>hypotenuse $c$ : ? km   |

B. Choose the one best answer to each question.

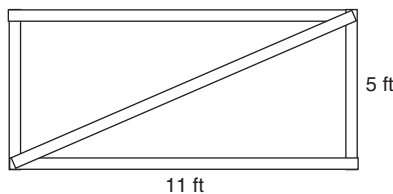
10. On a coordinate plane, points  $A$ ,  $B$ , and  $C$  can be connected to form a right triangle.



What is the distance from  $A$  to  $C$ , to the nearest tenth unit? (*Hint*: Count units to find the lengths of the sides, and use the Pythagorean relationship to find the distance between the points.)

- (1) 5.2  
(2) 6.7  
(3) 8.4  
(4) 10.1  
(5) 22.5
11. The two shorter sides of a right triangle measure 18 ft and 24 ft. What is the measure in feet of the third side?
- (1) 25  
(2) 28  
(3) 30  
(4) 42  
(5) Not enough information is given.

12. Jan has built a rectangular frame out of wood to use for the bottom of a platform. He wants to add a diagonal brace as shown in the drawing below.



What will the length of the brace be to the nearest tenth foot?

- (1) 16.0  
(2) 13.7  
(3) 12.8  
(4) 12.1  
(5) 11.5
13. The hypotenuse of a right triangle measures 39 inches. If one leg measures 15 inches, what is the measure of the other leg?
- (1) 42  
(2) 36  
(3) 24  
(4) 18  
(5) 12

Answers and explanations begin on page 684.

## GEOMETRY

## Using the Formulas Page

**Key Ideas**

- The GED formulas page will contain all the formulas you might need on the GED Math Test.
- The formulas on the page are written in words and are organized by purpose.
- Memorize as many formulas as you can in case you don't have time to look up every formula.

**GED TIP**

*To memorize the formulas, think about what they have in common. For example, the area formulas for squares, rectangles, and parallelograms all multiply base and height.*

**Using Formulas on the GED Math Test**

The GED formulas page lists all the formulas you might need to solve some of the questions on the test. For your convenience, this page is reprinted on page 688 of this book. Look at the page now, and pay close attention to how the formulas are organized. As you can see, the formulas are grouped by purpose. For example, all the area formulas are contained in the first group.

To get the best score possible, you should have the formulas on this page memorized. However, if you forget a formula or are unsure during the test, you can quickly check this list to find the right formula.

The formulas on the GED formulas page are written with words instead of with variables. This eliminates the confusion of knowing what each variable represents. On the other hand, you may find it easier to memorize the formulas if you replace the words with variables. Throughout this book, the formulas have been presented using both words and variables.

To get a good score on the GED Math Test, you need to use the right formula at the right time. Think about the situation presented in the problem; then choose the formula that makes sense.

**Example:** Ryan plans to put crown molding in his dining room. The molding will be attached to the upper edge of the four walls of the room. The room is 14 ft by 12 ft. The walls are 7 ft high. Which of the following expressions could be used to find the amount of molding Ryan should buy?

- (1)  $14(12)$
- (2)  $2(14) + 2(12)$
- (3)  $4(14)$
- (4)  $(14)(12)(7)$
- (5)  $\frac{1}{2}(14)(7)$

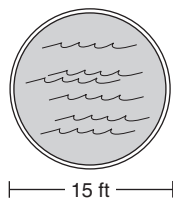
1. Choose the correct formula. The distance around the upper edge of the four walls is the perimeter of the room. (You don't need to use the height of the ceiling to find the perimeter.) Since the room is rectangular, use the formula:  $\text{Perimeter} = 2 \times \text{length} + 2 \times \text{width}$ .
2. Compare the answer choices to the formula. Only option (2) multiplies both the length and the width by 2 and then adds the products. The correct answer is **(2)  $2(14) + 2(12)$** .

Now look at the incorrect options. All apply incorrect formulas for this situation. Option (1) finds the area of the ceiling. Option (3) finds the perimeter of a square. Option (4) finds the volume in cubic feet of the rectangular room, and option (5) finds the area of a triangle with a base of 14 ft and a height of 7 ft.

## GEOMETRY ► PRACTICE 12

Choose the **one best answer** to each question.

Questions 1 and 2 refer to the drawing.



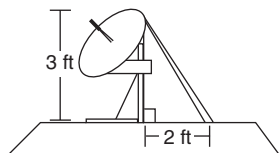
1. Don is installing the fishpond shown in the diagram at a children's health clinic. If the pond is 1.5 feet deep, which of the following expressions could be used to find how many cubic feet of water the pond will hold?

- (1)  $1.5(15)$
- (2)  $1.5(7.5^2)$
- (3)  $\pi(15)$
- (4)  $\pi(15)(1.5)$
- (5)  $\pi(7.5^2)(1.5)$

2. A local artist plans to paint an ocean scene on the bottom of the pond. Which of the following expressions could be used to find the number of square feet the painting will cover?

- (1)  $(15)(7.5)$
- (2)  $(15)(15)$
- (3)  $\pi(15^2)$
- (4)  $\pi(7.5^2)$
- (5)  $\pi(15)$

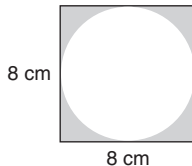
3. A satellite dish is secured to a house with a diagonal metal brace, as shown below.



Which of the following expressions could be used to find the length of the brace?

- (1)  $2^2 + 3^2$
- (2)  $3^2 - 2^2$
- (3)  $\sqrt{3^2 - 2^2}$
- (4)  $\sqrt{3^2 + 2^2}$
- (5)  $\sqrt{3^2 - 2^2}$

4. Which of the following expressions could be used to find the area of the shaded portion of the figure?

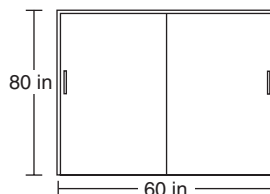


- (1)  $8^2 - (4^2 \times \pi)$
- (2)  $8^3 - (4^2 \times \pi)$
- (3)  $8^2 - 8\pi$
- (4)  $8^2 - (8^2 \times \pi)$
- (5)  $8^3 - 8\pi$

5. Alicia wants to buy a portable air conditioner for her bedroom. Each air conditioner is rated according to the maximum number of cubic feet it can cool. Alicia's bedroom measures 14 by 15 feet. The ceiling height is 7 feet. Which of the following expressions could she use to find the cubic footage of her bedroom?

- (1)  $2(15) + 2(14)$
- (2)  $2(15)(14)$
- (3)  $4(14)(7)$
- (4)  $7(15 + 14)$
- (5)  $15(14)(7)$

6. Marc is installing custom sliding doors. A metal molding will go across the top of the doors and down the two sides.



Which expression could be used to find how many inches of metal molding is needed?

- (1)  $60(80)$
- (2)  $60 + 2(80)$
- (3)  $80 + 2(60)$
- (4)  $2(60) + 2(80)$
- (5)  $2(80\ 60)$

**Answers and explanations begin on page 684.**

## GEOMETRY

## Using the Calculator

**Key Ideas**

- When a problem involves many calculations, use the order of operations to decide what operation to do first.
- Check your work by estimating an answer or by quickly repeating the keystrokes to see if the result is the same.

**GED TIP**

When calculating a multi-step problem, write down the results of each step as you work. Then if you make an error entering, you can go back to the most recent step instead of starting over.

**Using the Calculator with Formulas**

When solving problems with formulas, you can generally save time by performing some or all of the operations on a calculator. Remember the order of operations when solving formulas and always check your work, either by re-entering the key sequence or by estimating an answer and comparing your answer to the estimate.

**Example 1:** A pyramid has a height of 81 feet. The base is in the shape of a square with each side measuring 40 feet. What is the volume in cubic feet of the pyramid?

Use the formula:  $\text{Volume} = \frac{1}{3} \times (\text{base edge})^2 \times \text{height}$

Substitute:  $\text{Volume} = \frac{1}{3} \times (40^2) \times 81$

Find the value. In the table below, each step is calculated separately.

Steps	Key Sequence	Display
Evaluate the exponent.	40 $x^2$	1600.
Multiply by 81.	$\times$ 81	129600.
Divide by 3.	$\div$ 3 $=$	43200.

In the last step, you divided by 3 instead of multiplying by  $\frac{1}{3}$ . Both operations give the same result.

Using the *Casio fx-260*, you can enter the calculation in one series of keystrokes. This sequence uses the fraction key to multiply by  $\frac{1}{3}$ .

Press: 1  $\left[ \frac{a^b/c}{\square} \right]$  3  $\times$  40  $x^2$   $\times$  81  $=$  43200.

The volume of the pyramid is **43,200 square feet**.

You need your calculator to find the exact answer to problems that involve the Pythagorean relationship. These problems can also be done in one series of keystrokes.

**Example 2:** A right triangle has legs 10 inches and 24 inches in length. What is the length of the hypotenuse?

Use the formula:  $a^2 + b^2 = c^2$ . You will need to add the squares of the legs and then find the square root of the total.

Press: 10  $x^2$   $+$  24  $x^2$   $=$   $\left[ \text{SHIFT} \right]$   $x^2$  The display reads: 26

The hypotenuse is **26 inches** in length.

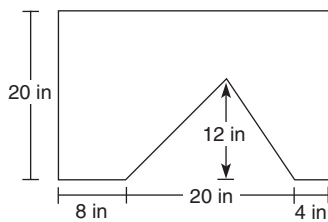
## GEOMETRY ► PRACTICE 13

### A. Use your calculator to evaluate each formula.

- Find the perimeter of a rectangle with a length of 16 inches and a width of 5 inches.  
Perimeter =  $2 \times \text{length} + 2 \times \text{width}$
- Find the area of a triangle with a base of 26 centimeters and a height of 15 centimeters.  
Area =  $\frac{1}{2} \times \text{base} \times \text{height}$
- What is the volume of a cube if the edge measures 3.5 feet? Round to the nearest cubic foot.  
Volume =  $\text{edge}^3$
- What is the measure of the hypotenuse of a right triangle when the legs measure 13 cm and 9 cm? Round your answer to the nearest tenth.  
Pythagorean relationship:  $a^2 + b^2 = c^2$
- Find the circumference of a circle with a diameter of 12 inches. Round to the nearest tenth.  
Circumference =  $\pi \times \text{diameter}$
- Find the volume of a cone with a radius of 12 cm and a height of 20 cm. Round to the nearest  $\text{cm}^3$ .  
Volume =  $\frac{1}{3} \times \pi \times \text{radius}^2 \times \text{height}$

### B. Choose the one best answer to each question.

Question 7 refers to the following drawing.



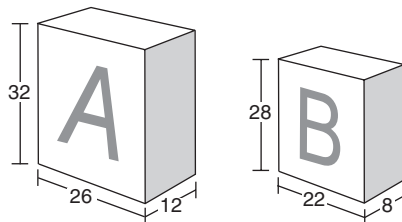
7. For a woodworking project, Paul cuts the shape shown above from plywood. What is the area in square inches of the piece?  
(Hint: Think of the shape as a triangle removed from a rectangle.)

- 240
- 400
- 480
- 520
- 640

8. To the nearest cubic meter, what is the volume of a cylinder with a radius of 1.5 meters and a height of 5 meters?

- 25
- 35
- 45
- 141
- 254

Questions 9 and 10 refer to the drawing.



All measurements are in centimeters.

9. How many cubic centimeters greater is the volume of Box A than the volume of Box B?

- 64
- 1,448
- 4,928
- 5,056
- 14,912

10. An advertiser plans to print advertisements on one side panel of each of the boxes (the shaded faces in the drawing). What is the total area, in square centimeters, that the advertiser will cover?

- 1448
- 1200
- 608
- 208
- 160

Answers and explanations begin on page 685.

## GEOMETRY

## Problem Solving

## Key Ideas

- You need logical reasoning to draw a true conclusion from the facts given in a problem.
- You can use logical reasoning to determine missing measures in a figure.
- You can also use logical reasoning to eliminate incorrect answer choices.

## GED TIP

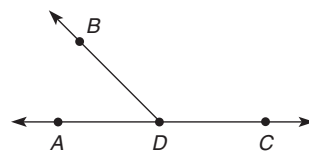
*Don't assume facts that are not stated. In Example 2, the triangles look congruent. However, since no sides in  $\triangle DEF$  are given, you cannot know the triangles are congruent.*

## Using Logical Reasoning

Some questions on the GED Math Test will require you to draw a conclusion from the information given. These questions often ask you to determine which of five statements is true (or not true). **Logical reasoning** is step-by-step thinking. You start with the facts in the problem, and then use these facts to find new facts until you have enough information to draw a final conclusion.

**Example 1:** If point  $D$  lies on line  $AC$ , which of the following statements must be true?

- (1)  $\angle ADB$  is a right angle.
- (2)  $\angle BDC$  is an acute angle.
- (3)  $m\angle ADB + m\angle BDC = 180^\circ$
- (4)  $\angle ADB$  and  $\angle BDC$  are congruent.
- (5)  $\angle ADB$  and  $\angle BDC$  are complementary.

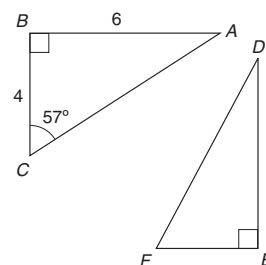


Since a line passes through points  $A$ ,  $D$ , and  $C$ ,  $\angle ADC$  is a straight angle with a measure of  $180^\circ$ . From the drawing, you can see that a ray extends from point  $D$ . Therefore, the sum of the angles formed by the ray and the line,  $\angle ADB$  and  $\angle BDC$ , must be supplementary and equal  $180^\circ$ . The correct choice is (3)  $m\angle ADB + m\angle BDC = 180^\circ$ .

If you cannot see how to solve a problem directly, you can often use logical reasoning to eliminate incorrect choices. As you work, remember that a statement cannot be considered true unless it can be proved using the information included in the problem.

**Example 2:** Triangles  $ABC$  and  $DEF$  are similar triangles, and  $\angle F$  corresponds to  $\angle C$ . Which of the following must be a true statement?

- (1)  $\angle A$  is a right angle.
- (2) The measure of  $ED$  is 6 units.
- (3)  $EF$  measures 12 units.
- (4)  $\triangle DEF$  is an isosceles triangle.
- (5)  $m\angle D = 33^\circ$



Option (1) is incorrect because a triangle can have only one right angle. Since  $\angle B$  measures  $90^\circ$ ,  $\angle A$  cannot be a right angle.

Both options (2) and (3) could be true, but you cannot prove they are true from the information in the problem. You know that the two triangles are similar, but you do not know any sides' measures in  $\triangle DEF$ . You need at least one side measure in  $\triangle DEF$  to write a proportion.

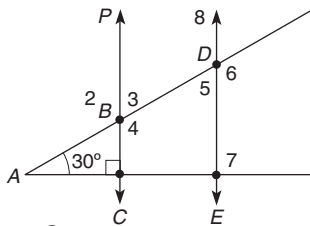


Option (4) must be incorrect because an isosceles triangle has two congruent sides and two congruent angles. The angles in  $\triangle ABC$  have different measures. Two are known:  $57^\circ$  and  $90^\circ$ . Since the sum of the angles in a triangle equals 180, the measure of  $\angle A$  is  $33^\circ$ . Since the triangles are similar, the angles in  $\triangle DEF$  also measure  $33^\circ$ ,  $57^\circ$ , and  $90^\circ$ . By process of elimination, **option (5)** must be correct.  $\angle D$  corresponds to  $\angle A$ , so  $m\angle D = 33^\circ$ .

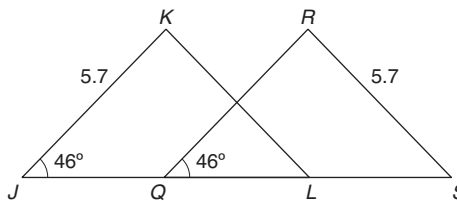
## GEOMETRY ► PRACTICE 14

Choose the **one best answer** to each question.

Questions 1 and 2 refer to the following figure. Question 4 refers to the following figure.



line  $P \parallel$  line  $Q$



- Which of the following is a true statement about the figure?
  - $m\angle 2 + m\angle 7 = 180^\circ$
  - $m\angle 4 = m\angle 7$
  - $m\angle 3 + m\angle 4 = 90^\circ$
  - $m\angle 3 + m\angle 6 = 180^\circ$
  - $m\angle 2 = m\angle 3$
- Which of the following conclusions can you draw based on the information given in the drawing?
  - $m\angle 5 = 60^\circ$
  - $\angle 7$  is an obtuse angle.
  - $m\angle 3 = 30^\circ$
  - $\angle 7$  and  $\angle 5$  are alternate interior angles.
  - $\angle 2$  must be a right angle.
- Two sides of Triangle  $A$  measure 4 and 5 inches. Two sides of Triangle  $B$  measure 8 and 10 inches. Which of the following conclusions can you draw about the two triangles?
  - $\triangle A$  and  $\triangle B$  are similar triangles.
  - Both are isosceles triangles.
  - Neither contains a right angle.
  - $\triangle A$  and  $\triangle B$  are not congruent.
  - $\triangle A$  is an acute triangle, but  $\triangle B$  is not.
- The distance from  $J$  to  $L$  is 8 units, and the distance from  $Q$  to  $S$  is 8 units. Which of the following conclusions can you draw?
  - $m\angle JLK = m\angle QRS$
  - $\triangle JKL$  and  $\triangle QRS$  are congruent.
  - $\angle K$  measures  $46^\circ$ .
  - The distance from  $J$  to  $S$  is 16 units.
  - $\angle JLK$  measures  $44^\circ$ .
- In a parallelogram, an angle measures  $65^\circ$ . What are the measures of the remaining three angles?
  - Each measures  $65^\circ$ .
  - Each measures about  $98^\circ$ .
  - $115^\circ$ ,  $115^\circ$ , and  $65^\circ$
  - $115^\circ$ ,  $90^\circ$ , and  $90^\circ$
  - Not enough information is given.
- Two sides of a triangle measure 6 and 10 inches. If the triangle is a right triangle, which of the following could be the measure, in inches, of the third side?
  - 4
  - 6
  - 8
  - 10
  - 12

Answers and explanations begin on page 685.

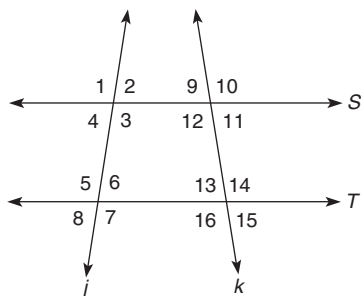


# GEOMETRY PRACTICE QUESTIONS

## PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

Questions 1 through 3 refer to the figure.

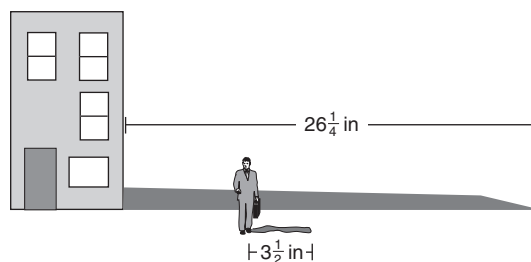


$$S \parallel T \quad m\angle 1 = 77^\circ \quad m\angle 10 = 95^\circ$$

- Which of the following angles is equal in measure to  $\angle 3$ ?
  - $\angle 13$
  - $\angle 9$
  - $\angle 8$
  - $\angle 5$
  - $\angle 2$
- Classify the figure containing interior angles 3, 6, 12, and 13.
  - scalene triangle
  - trapezoid
  - parallelogram
  - rectangle
  - square
- What is the measure of  $\angle 15$ ?
  - $103^\circ$
  - $95^\circ$
  - $85^\circ$
  - $77^\circ$
  - Not enough information is given.
- In an isosceles triangle, the largest angle is equal to the sum of the two smaller angles. What is the measure of the largest angle?
  - $120^\circ$
  - $100^\circ$
  - $90^\circ$
  - $60^\circ$
  - Not enough information is given.

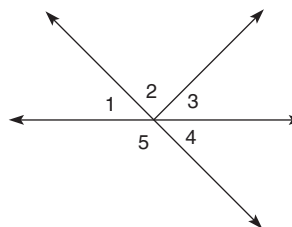
- The floor of a walk-in closet measures 7 feet by 4 feet. If the ceiling height is 8 feet, what is the volume in cubic feet of the closet?
  - 28
  - 56
  - 112
  - 168
  - 224

Question 6 refers to the following drawing.



- The diagram shows the length of the shadows of a man and a building at 4 P.M. If the man in the drawing is 6 feet in height, what is the height of the building in feet?
  - 37
  - 42
  - 45
  - 56
  - 91

Question 7 refers to the following figure.

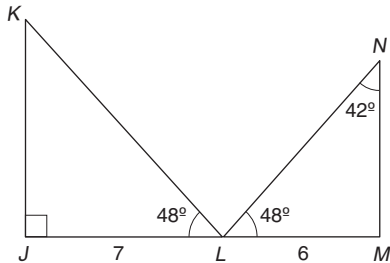


- If  $m\angle 1 = 35^\circ$ , what is the measure of  $\angle 3$ ?
  - $35^\circ$
  - $55^\circ$
  - $75^\circ$
  - $145^\circ$
  - Not enough information is given.

## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator.

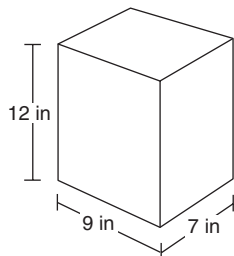
8. Given the information in the diagram, what can you conclude about  $\triangle LMN$  and  $\triangle JKL$ ?



- (1)  $\triangle JKL$  and  $\triangle LMN$  are congruent.  
 (2)  $\triangle JKL$  and  $\triangle LMN$  are similar.  
 (3)  $\triangle JKL$  and  $\triangle LMN$  are isosceles.  
 (4)  $\triangle JKL$  and  $\triangle LMN$  have the same area.  
 (5)  $\triangle JKL$  and  $\triangle LMN$  have the same perimeter.
9. Using a compass, Max hikes 300 yards due north of his campsite. From that point, he hikes 400 yards due east. If he walks directly to his campsite from this point, how many yards would he have to hike?

- (1) 400  
 (2) 500  
 (3) 600  
 (4) 700  
 (5) Not enough information is given.
10. The rectangular base of a container measures 9 by 7 inches. By how many cubic inches will the volume of the container increase if you increase the length of the base by 2 inches?

- (1) 18  
 (2) 84  
 (3) 126  
 (4) 168  
 (5) 216



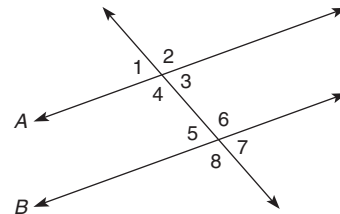
11. In a right triangle, the hypotenuse measures 15 inches. If one leg of the triangle measures 6 inches, which of the following equations could be used to find the length of the other leg ( $x$ ) in inches?

- (1)  $x = \sqrt{15 + 6}$   
 (2)  $x = \sqrt{15 - 6}$   
 (3)  $x = 15 - 6$   
 (4)  $x^2 = 15^2 + 6^2$   
 (5)  $x^2 = 15^2 - 6^2$

12. The length of a rectangle is three times its width. If the perimeter of the rectangle is 96 inches, what is its length in inches?

- (1) 12  
 (2) 24  
 (3) 32  
 (4) 36  
 (5) 48

Questions 13 and 14 refer to the following figure.



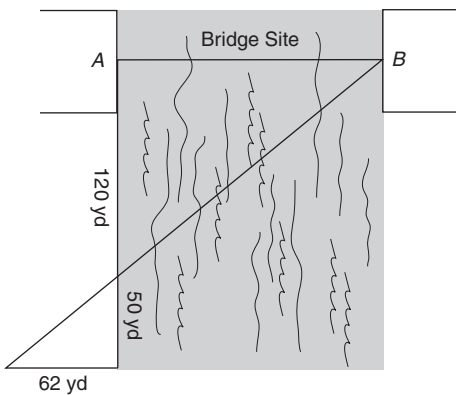
13. If  $A \parallel B$ , which of the following pairs of angles have the same measure?

- (1)  $\angle 1$  and  $\angle 6$   
 (2)  $\angle 2$  and  $\angle 3$   
 (3)  $\angle 2$  and  $\angle 8$   
 (4)  $\angle 3$  and  $\angle 6$   
 (5)  $\angle 4$  and  $\angle 7$

14. You can draw the conclusion that angles 5 and 7 are equal in measure because they are what kind of angles?

- (1) vertical angles  
 (2) alternate interior angles  
 (3) corresponding angles  
 (4) complementary angles  
 (5) alternate exterior angles

Question 15 refers to the following diagram.



15. A city plans to build a bridge across a local river. To find the width the bridge will span, an engineer stakes out two similar triangles. Which equation could be used to find the distance from point  $A$  to point  $B$ ?

- (1)  $\frac{50}{120} = \frac{AB}{62}$
- (2)  $\frac{120}{50} = \frac{AB}{62}$
- (3)  $\frac{120}{AB} = \frac{62}{50}$
- (4)  $\frac{120}{50} = \frac{62}{AB}$
- (5)  $\frac{50}{62} = \frac{AB}{120}$

Questions 16 and 17 refer to the following.

A classroom is 40 feet long and 25 feet wide. The ceiling height is 12 feet. The school district plans to repaint the room and put in air conditioning. The ceiling tile will not be painted.

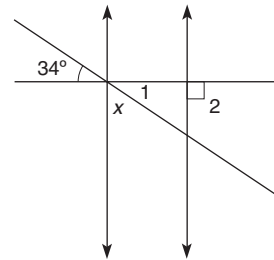
16. What is the approximate total square footage of the four walls of the room? Ignore space taken up by windows and doors.

- (1) 1,200
- (2) 1,560
- (3) 1,920
- (4) 4,000
- (5) 12,000

17. To choose an air conditioning system, the school district must know the volume of the room. What is the volume in cubic feet?

- (1) 1,000
- (2) 3,120
- (3) 12,000
- (4) 15,625
- (5) 64,000

Question 18 refers to the following figure.



18. What is the measure of the angle marked  $x$ ?

- (1)  $34^\circ$
- (2)  $45^\circ$
- (3)  $56^\circ$
- (4)  $146^\circ$
- (5) Not enough information is given.

19. A parallelogram has a base of 6 centimeters and a height of 10 centimeters. This parallelogram has the same area as a triangle with a height of 5 centimeters. What is the measure, in centimeters, of the base of the triangle?

Mark your answer in the circles on the grid below.

20. Angles  $R$  and  $S$  are supplementary angles. If  $\angle R$  measures  $16^\circ$ , what is the measure, in degrees, of  $\angle S$ ?

Mark your answer in the circles on the grid below.

19.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

20.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

**Answers and explanations begin on page 685.**

## GEOMETRY

Points, Lines,  
and Angles

## Key Ideas

- Most geometric figures are named by points that lie on the figure.
- Angles are measured in degrees and are classified by their measures.
- The sum of two complementary angles is  $90^\circ$ . The sum of two supplementary angles is  $180^\circ$ .

## GED TIP

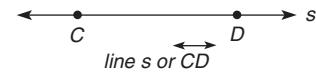
A geometric drawing may show several figures at once. As you read a problem, find each figure named in the problem.

## Basic Definitions

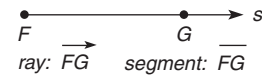
A **point** is a single location in space. We assign a name to a point by writing a letter next to it. A **plane** is a collection of points that extends to form a flat surface. In the drawing, point  $A$  lies on plane  $P$ .



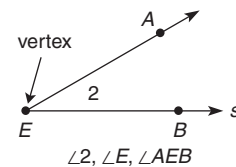
Much of your work in geometry will be concerned with lines and angles. A **line** is a straight pathway of points that extends indefinitely in two directions. A line may be named by a single letter or by two points on the line.



A **ray** is part of a line that begins at an endpoint and extends indefinitely in one direction. A portion of a line with two endpoints is called a **line segment**. Both rays and line segments are named using two points.

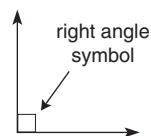


When two rays share an endpoint, they form an **angle**. The shared endpoint is the vertex of the angle. An angle can be named in different ways: by a number written in degrees inside the angle, by the vertex, or by the points on the angle. The symbol  $\angle$  means angle.

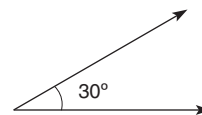


Angles are measured in degrees, indicated by a number and the symbol  $^\circ$ . We classify angles by their measurement.

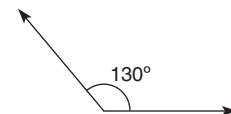
A **right angle** forms a square corner and measures  $90^\circ$ . A right angle is often identified by a small square drawn inside it (see below).



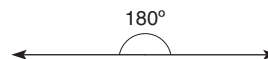
An **acute angle** is less than  $90^\circ$ .



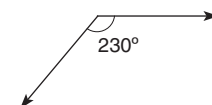
An **obtuse angle** is greater than  $90^\circ$  but less than  $180^\circ$ .



A **straight angle** measures  $180^\circ$ .

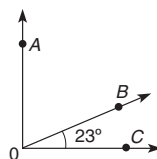


A **reflex angle** has a measure greater than  $180^\circ$  but less than  $360^\circ$ .



Some GED math problems are about angle relationships. When the sum of two angles is  $90^\circ$ , a right angle, the angles are **complementary**. When the sum of two angles is  $180^\circ$ , a line or straight angle, the angles are **supplementary**. You can use this information to solve for a missing angle measure.

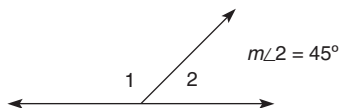
**Example 1:** In the drawing,  $\angle AOB$  and  $\angle BOC$  are complementary. What is the measure of  $\angle AOB$ ?



The measure of angle  $BOC$  is given as  $23^\circ$ , or  $m\angle BOC = 23^\circ$ . The sum of the angles is  $90^\circ$ . Therefore,  $\angle AOB$  measures  $67^\circ$ .

$$\begin{aligned} m\angle AOB + 23^\circ &= 90^\circ \\ m\angle AOB &= 90^\circ - 23^\circ \\ m\angle AOB &= 67^\circ \end{aligned}$$

**Example 2:** In the drawing,  $\angle 1$  and  $\angle 2$  are supplementary. What is the measure of  $\angle 1$ ?



$\angle 2$  measures  $45^\circ$ . The sum of the angles is  $180^\circ$ .  $\angle 1$  measures  $135^\circ$ .

$$\begin{aligned} m\angle 2 + 45^\circ &= 180^\circ \\ m\angle 2 &= 180^\circ - 45^\circ \\ m\angle 2 &= 135^\circ \end{aligned}$$

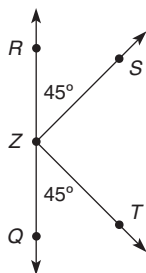
## GEOMETRY ► PRACTICE 1

**A. Classify each angle based on its angle measure.**

- |               |                |                |                |
|---------------|----------------|----------------|----------------|
| 1. $55^\circ$ | 3. $180^\circ$ | 5. $270^\circ$ | 7. $30^\circ$  |
| 2. $95^\circ$ | 4. $18^\circ$  | 6. $90^\circ$  | 8. $110^\circ$ |

**B. Choose the one best answer to each question.**

Questions 9 and 10 refer to the drawing below.



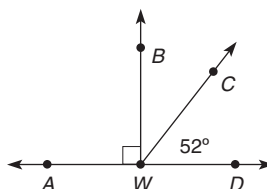
9.  $\angle QZR$  is a straight angle. What is the measure of  $\angle QZS$ ?

- (1)  $135^\circ$
- (2)  $125^\circ$
- (3)  $90^\circ$
- (4)  $60^\circ$
- (5)  $45^\circ$

10. What kind of angle is  $\angle SZT$ ?

- (1) acute
- (2) obtuse
- (3) right
- (4) straight
- (5) reflex

Questions 11 and 12 refer to the following drawing.



11.  $\angle AWD$  is a straight angle. What is the measure of  $\angle BWC$ ?

- (1)  $38^\circ$
- (2)  $52^\circ$
- (3)  $128^\circ$
- (4)  $142^\circ$
- (5) Not enough information is given.

12. What type of angle is  $\angle AWC$ ?

- (1) right
- (2) acute
- (3) obtuse
- (4) reflex
- (5) straight

**Answers and explanations begin on page 682.**

## GEOMETRY

## Parallel Lines and Transversals

**Key Ideas**

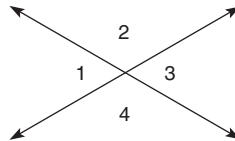
- Vertical angles, which are equal in measure, are formed when two lines intersect.
- When a transversal crosses two parallel lines, special angle relationships form.
- You can find the measure of any angle formed by the transversal if the measure of one angle is known.

**GED TIP**

You can often tell which angles are equal by looking at a figure. However, you must be able to prove two angles are equal to answer set-up questions and problems on logical reasoning.

**Working with Vertical Angles and Transversals**

When two lines intersect, they form two pairs of vertical angles. **Vertical angles** have the same angle measure. In the drawing,  $\angle 1$  and  $\angle 3$  are vertical angles, as are  $\angle 2$  and  $\angle 4$ .



Intersecting lines also form adjacent angles. **Adjacent angles** share the same ray. For example,  $\angle 1$  and  $\angle 2$  are adjacent angles. The adjacent angles in this figure are supplementary angles because their sum is  $180^\circ$ , the measure of a straight angle. If you know the measure of one angle, you can find the measures of the other three angles.

**Example 1:** In the figure above,  $m\angle 1 = 35^\circ$ . What are the measures of  $\angle 2$ ,  $\angle 3$ , and  $\angle 4$ ?

1.  $\angle 1$  and  $\angle 2$  are supplementary so their sum equals  $180^\circ$ . Solve for  $\angle 2$ .  

$$m\angle + 35^\circ = 180^\circ$$

$$m\angle 2 = 145^\circ$$
2. Angles 1 and 3 are vertical, so both measure  $35^\circ$ . Angles 2 and 4 are vertical, so both measure  $145^\circ$ .  

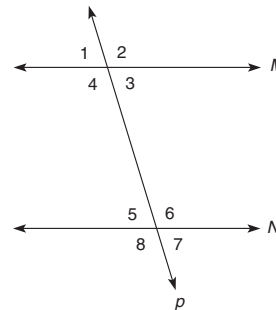
$$m\angle 1 = 35^\circ, m\angle 3 = 35^\circ,$$

$$m\angle 2 = 145^\circ, m\angle 4 = 145^\circ$$

**Parallel lines** are lines that are exactly the same distance apart. No matter how far they extend, they will never touch. The symbol for parallel is  $\parallel$ . A **transversal** is a line that intersects two or more other lines. When a transversal intersects two parallel lines, special angle relationships are formed.

In the drawing,  $M \parallel N$ . The transversal, line  $P$ , forms eight angles.

Each angle matches another angle in the same position on the transversal. These angles, called **corresponding angles**, always have the same measure. The corresponding angles are  $\angle 1$  and  $\angle 5$ ,  $\angle 2$  and  $\angle 6$ ,  $\angle 3$  and  $\angle 7$ , and  $\angle 4$  and  $\angle 8$ .

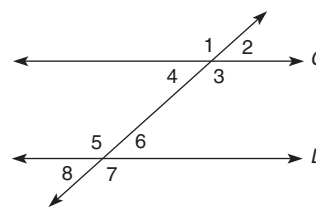


**Alternate exterior angles**, which are also equal in measure, are on opposite sides of the transversal and are on the outside of the parallel lines. One pair of alternate exterior angles is  $\angle 1$  and  $\angle 7$ . The other is  $\angle 2$  and  $\angle 8$ .

**Alternate interior angles** are on opposite sides of the transversals and are inside the parallel lines. One pair of alternate interior angles is  $\angle 3$  and  $\angle 5$ . The other is  $\angle 4$  and  $\angle 6$ . Alternate interior angles are always equal in measure.

**Example 2:** In the figure,  $C \parallel D$ . If  $m\angle 4 = 48^\circ$ , what is the measure of  $\angle 5$ ?

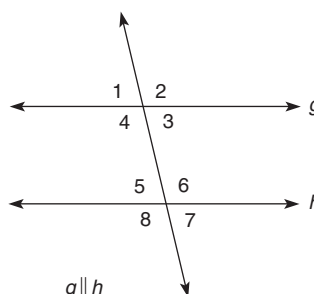
1. There are many ways to solve the problem. Here is one way:  $\angle 4$  and  $\angle 8$  are corresponding angles, so  $m\angle 8 = 48^\circ$ .
2.  $\angle 8$  and  $\angle 5$  are supplementary angles, so  $m\angle 5 + 48^\circ = 180^\circ$ , and  $m\angle 5 = 132^\circ$ .



## GEOMETRY ► PRACTICE 2

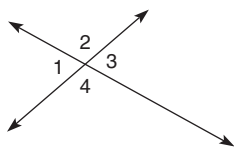
**A. Using the figure shown at the right, solve as directed.**

1. List one pair of alternate interior angles.
2. Which angle corresponds to  $\angle 7$ ?
3. If  $m\angle 3 = 80^\circ$ , what is  $m\angle 8$ ?
4. List one pair of alternate exterior angles.
5. List one pair of vertical angles.
6. Which angle corresponds to  $\angle 8$ ?



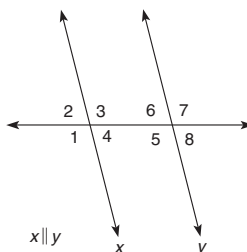
**B. Choose the one best answer to each question.**

Question 7 refers to the following figure.



7. The measure of  $\angle 3$  is  $75^\circ$ . What is the measure of  $\angle 1$ ?
  - (1)  $50^\circ$
  - (2)  $75^\circ$
  - (3)  $105^\circ$
  - (4)  $115^\circ$
  - (5) Not enough information is given.
8. Which of the following is a true statement about corresponding angles?
  - (1) They are also vertical angles.
  - (2) They are also supplementary angles.
  - (3) They are in the same position from one parallel line to the other.
  - (4) They are also alternate interior angles.
  - (5) They are also alternate exterior angles.

Questions 9 and 10 refer to the following figure.



9. The measure of  $\angle 7$  is  $115^\circ$ . What is the measure of  $\angle 4$ ?
  - (1)  $25^\circ$
  - (2)  $65^\circ$
  - (3)  $115^\circ$
  - (4)  $245^\circ$
  - (5) Not enough information is given.
10. Which of the following angles is equal in measure to  $\angle 2$ ?
  - (1)  $\angle 1$
  - (2)  $\angle 3$
  - (3)  $\angle 5$
  - (4)  $\angle 7$
  - (5)  $\angle 8$

**Answers and explanations begin on page 682.**

## GEOMETRY

## Quadrilaterals

**Key Ideas**

- Quadrilaterals are classified by the properties of their sides and angles.
- The sum of the interior angles of any quadrilateral is  $360^\circ$ .
- By using the properties of quadrilateral and algebraic reasoning, you can find missing angle measures.

**GED TIP**

*Don't rely on sight alone to identify a geometric figure. Read carefully to see which properties are given. Some properties may be noted on the figure itself. Then identify the figure based on the properties.*

**The Properties of Quadrilaterals**

A **quadrilateral** is a closed shape with four sides. To prepare for the GED Math Test, learn the properties of each shape. You will need to identify the characteristics of different types of quadrilaterals and draw conclusions about their angles and sides.

You are already familiar with rectangles and squares. A **rectangle** is a four-sided figure with four right angles. The opposite sides (sides across from each other) are the same length, and they are parallel.

A **square** is actually a kind of rectangle. It, too, has four right angles with parallel opposite sides. However, a square has one additional property: its four sides are all the same length.

A **parallelogram** is a four-sided figure whose opposite sides are parallel and the same length. In addition, its opposite angles (the angles diagonally across from each other) are also equal in measure. A special parallelogram, called a **rhombus** (not shown), has four sides of equal length.

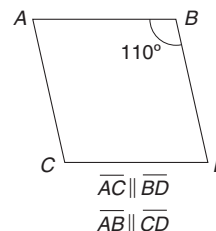
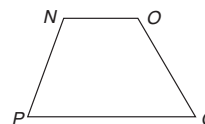
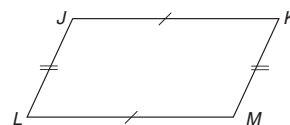
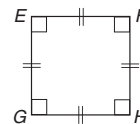
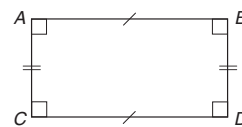
A **trapezoid** is a four-sided figure with exactly one pair of parallel sides. The definition of a trapezoid does not dictate the measure of the angles nor the lengths of the sides.

All quadrilaterals have one important property in common. The sum of the measures of the interior angles is  $360^\circ$ . You can use this fact to find a missing angle measure.

**Example:** In figure  $ABCD$ , the opposite sides are parallel. What is the measure of  $\angle A$ ?

1. Identify the figure. The notation on the drawing tells you that the opposite sides are equal in measure. Since they are also parallel, the figure is a parallelogram.
2. Find the measure of  $\angle C$ . The opposite angles of a parallelogram are equal in measure; therefore,  $m\angle C = m\angle B$ . Both  $\angle B$  and  $\angle C$  measure  $110^\circ$ .

**Sides with the same markings are equal.**





3. Find the measure of  $\angle A$ . You know the measures of  $\angle A$  and  $\angle D$  are equal and that the sum of all four angles equals  $360^\circ$ . Let  $x = m\angle A$ . Therefore,  $2x =$  the sum of  $m\angle A$  and  $m\angle D$ . Write an equation and solve.
- $$2x + 100^\circ + 110^\circ = 360^\circ$$
- $$2x + 220^\circ = 360^\circ$$
- $$2x = 140^\circ$$
- $$x = 70^\circ$$

The measure of  $\angle A$  is  $70^\circ$ .

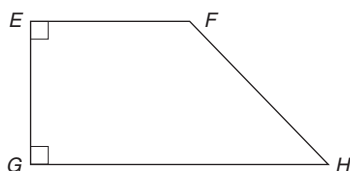
## GEOMETRY ► PRACTICE 3

A. List the names of quadrilaterals with the following properties. Write *None* if no quadrilateral has the given property.

- |                                       |  |
|---------------------------------------|--|
| 1. four right angles                  | 6. opposite angles are equal in measure    |
| 2. opposite sides are equal in length | 7. all four sides are equal in length      |
| 3. exactly one pair of parallel sides | 8. sum of interior angles is $360^\circ$   |
| 4. all angles are equal in measure    | 9. sides are all of different lengths      |
| 5. only three right angles            | 10. four equal angles and four equal sides |

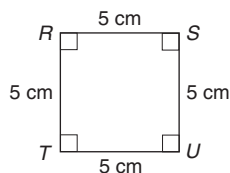
B. Choose the **one best answer** to each question.

Questions 11 and 12 refer to the following figure.



11. Angle  $F$  is  $20^\circ$  more than three times the measure of  $\angle H$ . What is the measure of  $\angle F$ ?
- (1)  $40^\circ$
  - (2)  $60^\circ$
  - (3)  $120^\circ$
  - (4)  $140^\circ$
  - (5)  $180^\circ$
12. In order for figure  $EFGH$  to be a trapezoid, which of the following must be a true statement?
- (1)  $EF$  is the same length as  $FH$
  - (2)  $EF \parallel GH$
  - (3)  $m\angle F = m\angle H$
  - (4)  $m\angle G = m\angle F$
  - (5) All sides must be of equal length.

Question 13 refers to the following figure.



13. If the opposite sides in figure  $RSUT$  are parallel, what is the measure of  $\angle R$ ?
- (1)  $5^\circ$
  - (2)  $20^\circ$
  - (3)  $90^\circ$
  - (4)  $270^\circ$
  - (5) Not enough information is given.
14. A quadrilateral has sides measuring 10, 15, 10, and 15. The opposite angles are equal, but there are no right angles. What is the figure?
- (1) square
  - (2) rhombus
  - (3) rectangle
  - (4) parallelogram
  - (5) trapezoid

Answers and explanations begin on page 682.

## GEOMETRY

## Triangles

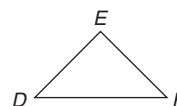
**Key Ideas**

- Triangles are named by their vertices.
- They are classified in two ways: by their side lengths and by their angle measures.
- The sum of the interior angles of any triangle is  $180^\circ$ .

**The Properties of Triangles**

A **triangle** is a closed three-sided figure. From the definition, we can infer other properties. Since a triangle has three sides, it must also have three interior angles and three vertices.

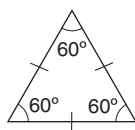
A triangle is named by writing its vertices in any order. The triangle shown at right could be named  $\triangle DEF$ . Its sides are  $DE$ ,  $EF$ , and  $DF$ .



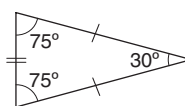
Triangles can be classified by the lengths of their sides and by the measures of their angles. In the figures below, sides with the same number of marks are equal.

**Classified by Side Lengths****equilateral triangle**

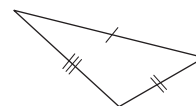
All sides are equal in length. Note that the angles also are equal.

**isosceles triangle**

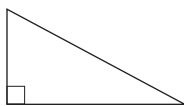
Exactly two sides are equal in length. Note that the two angles opposite these sides are equal.

**scalene triangle**

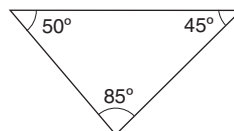
No sides are equal in length, and no angles are equal.

**Classified by Angle Measures****right triangle**

One angle measures  $90^\circ$ .

**acute triangle**

All angles measure less than  $90^\circ$ .

**obtuse triangle**

One angle is greater than  $90^\circ$ .

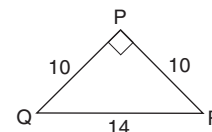


Each triangle can be classified in two ways.

**Example 1:** What kind of triangle is  $\triangle PQR$ ?

1. Classify by its sides: Two sides have the same length, so  $\triangle PQR$  is an isosceles triangle.
2. Classify by its angles:  $\angle P$  is a right angle, so  $\triangle PQR$  is a right triangle.

$\triangle PQR$  is a **right isosceles triangle**.

**GED TIP**

*Classify triangles by their properties, not by how they look. For example, the triangle in Example 1 may not look like a right triangle because the right angle is at the top.*

The sum of the measures of the interior angles for any triangle is  $180^\circ$ . We can use this fact to solve for a missing angle.

**Example 2:** In  $\triangle ABC$ ,  $\angle A$  measures  $55^\circ$  and  $\angle B$  measures  $100^\circ$ . What is the measure of  $\angle C$ ?

Write an equation and solve.

$$55^\circ + 100^\circ + \angle C = 180^\circ$$

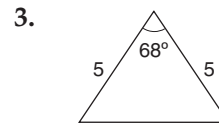
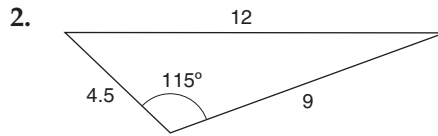
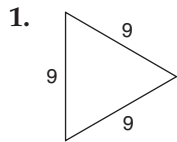
$$155^\circ + \angle C = 180^\circ$$

$$\angle C = 25^\circ$$

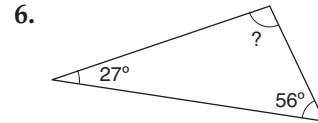
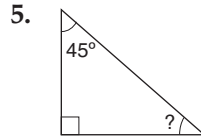
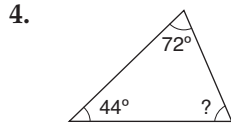
The measure of  $\angle C$  is  $25^\circ$ .

## GEOMETRY ► PRACTICE 4

A. Classify each triangle in two ways.

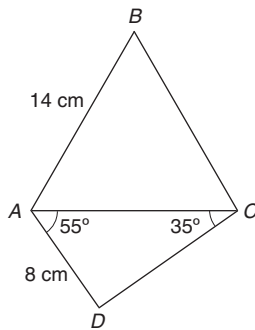


B. Find the measure of the unknown angle in each triangle.



C. Choose the **one best answer** to each question.

Questions 7 and 8 refer to the following figure.



7. If  $\angle DAB$  measures  $115^\circ$  and  $\angle DCB$  measures  $95^\circ$ , what is the length of side  $AC$  in centimeters? (*Hint:* Use the facts in the problem to find  $m\angle BAC$  and  $m\angle BCA$ .)

- (1) 6
- (2) 8
- (3) 14
- (4) 22
- (5) Not enough information is given.

8. What kind of triangle is  $\triangle ACD$ ?

- (1) equilateral
- (2) isosceles
- (3) acute
- (4) right
- (5) obtuse

9. One angle in a scalene triangle measures  $38^\circ$ , and another angle measures  $56^\circ$ . What is the measure of the third angle?

- (1)  $38^\circ$
- (2)  $56^\circ$
- (3)  $86^\circ$
- (4)  $124^\circ$
- (5)  $142^\circ$

**Answers and explanations begin on page 683.**

## GEOMETRY

## Congruent and Similar Triangles

## Key Ideas

- Congruent figures are the same size and shape. Similar figures are the same shape, but they do not have to be the same size.
- Prove triangles are congruent using the rules SSS, SAS, or ASA.
- Triangles are similar if two angles are congruent or if all corresponding sides are in proportion.

## GED TIP

When a figure is flipped or turned, it may be difficult to identify corresponding parts. Try redrawing one of the figures so that it is turned to match the first figure. Always label your sketch carefully.

## Comparing Triangles

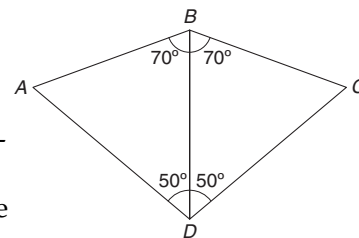
Figures are **congruent** (indicated by the symbol  $\cong$ ) when they have exactly the same size and shape. In other words, two figures are congruent if their corresponding parts (the angles and sides) are congruent. You can often tell that two geometric shapes are congruent by looking. However, in geometry, you must be able to prove that figures are congruent.

Two triangles are congruent if the following corresponding parts are congruent:

- Side-Side-Side (SSS)** The side measures for both triangles are the same.
- Side-Angle-Side (SAS)** Two sides and the angle between them are the same.
- Angle-Side-Angle (ASA)** Two angles and the side between them are the same.

**Example 1:** Are triangles  $ABD$  and  $BCD$  congruent?

1. Find the known corresponding parts:  
 $\angle ABD \cong \angle CBD$  and  $\angle ADB \cong \angle CDB$ .  
 Both triangles share side  $BD$ .
2. Is this enough information to prove the triangles are congruent? Yes, two angles and the side between them are equal. Using the ASA rule,  $\triangle ABD \cong \triangle CBD$ .



## Understanding Similarity

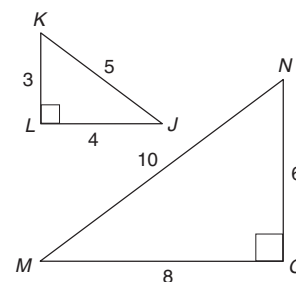
Figures are **similar** (shown by the symbol  $\sim$ ) when the corresponding angles are congruent and the corresponding sides are in proportion. In other words, similar figures always have the same shape, but they do not have to be the same size.

There are two rules that you can use to prove that two triangles are similar:

- Rule 1:** If two angle measures in the first triangle are equal to two angle measures in the second triangle, the triangles are similar.
- Rule 2:** If all corresponding sides have the same ratio, the triangles are similar.

**Example 2:** Are triangles  $JKL$  and  $MNO$  similar?

1. Compare corresponding angles. Since only one angle measure is given, you cannot use Rule 1 to prove the triangles are similar.
2. Write ratios comparing the sides in the first triangle to the corresponding sides in the second triangle. Each ratio is equal to  $\frac{1}{2}$ .



Since the ratios are equal, the triangles are similar:  $\triangle JKL \sim \triangle MNO$ .

$$\frac{\triangle JKL}{\triangle MNO} \quad \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{1}{2}$$

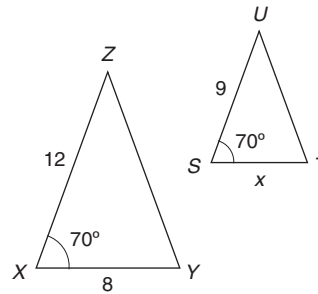
If you know that two triangles are similar, you can use proportion to find an unknown measure.

**Example 3:**  $\triangle XYZ \sim \triangle STU$ . What is the measure of side  $ST$ ?

Side  $SU$  corresponds to side  $XZ$ , and side  $ST$  corresponds to side  $XY$ . Set up a proportion and solve.

$$\frac{SU}{XZ} = \frac{ST}{XY} \quad \frac{9}{12} = \frac{x}{8} \quad 12x = 72 \quad x = 6$$

Side  $ST$  measures **6 units**.



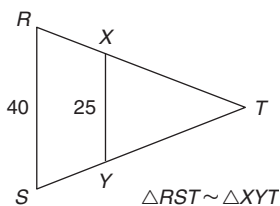
## GEOMETRY ► PRACTICE 5

**A.** For these items, the figures are not drawn to scale. Decide whether the triangles are congruent. Write *Yes*, *No*, or *Not Enough Information*.

- 
- 
- 

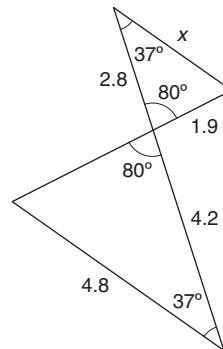
**B.** Choose the one best answer to each question.

Questions 4 and 5 refer to the following figure.



- What is the measure of side  $ST$  if side  $YT$  measures 30 units?
  - 30
  - 40
  - 45
  - 48
  - 55
- If  $m\angle S = 68^\circ$  and  $m\angle T = 48^\circ$ , what is the measure of  $\angle TXY$ ?
  - $48^\circ$
  - $64^\circ$
  - $68^\circ$
  - $116^\circ$
  - Not enough information is given.

Question 6 refers to the following figure.



- What is the measure of the side labeled  $x$ ?
  - 2.5
  - 2.9
  - 3.2
  - 3.8
  - 4.7

**Answers and explanations begin on page 683.**

## GEOMETRY

## Similar Triangle Applications

Key Ideas

- Use triangle relationships to indirectly measure distances.
- Objects and their shadows form similar triangles because the sun strikes both at the same angle.
- Use the corresponding angles and sides in similar triangles to measure the distance across a large object.

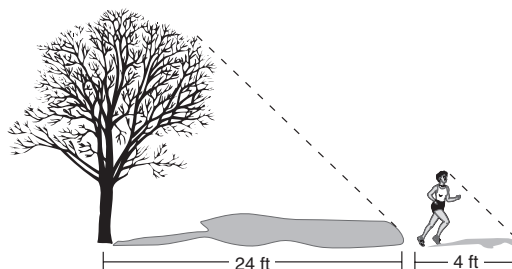
**GED TIP**

Sometimes you can easily see the scale used in a problem. In Example 1, the tree's shadow is six times the man's shadow; therefore, the tree's height must be six times the man's height:  $6 \times 6 = 36$  ft.

**Indirect Measurement**

Similar triangles are often used to measure objects that would be impossible to measure using ordinary tools. This process is called **indirect measurement**.

One common application involves using shadows to find the height of a tall object. In the diagram, both a man and a tree cast shadows at the same time of day. Since the angle of the sun is the same for both the man and tree, two similar triangles are formed.



We can easily measure the two shadows using ordinary tools. We can also measure the man's height. Using these facts, we can solve for the height of the tree.

**Example 1:** If the man in the diagram is 6 feet tall, what is the height of the tree?

Write a proportion and solve.

$$\frac{\text{man's shadow}}{\text{tree's shadow}} = \frac{4}{24} = \frac{6}{x} = \frac{\text{man's height}}{\text{tree's height}}$$

$$24(6) = 4x$$

$$144 = 4x$$

$$36 = x$$

The height of the tree is **36 feet**.

We also use indirect measurement to measure distance across a large object.

**Example 2:** An engineer needs to know the width of a small lake. Using surveyor's tools, she marks off two similar triangles. She measures the distances shown on the diagram. Using her findings, what is the width of the lake?

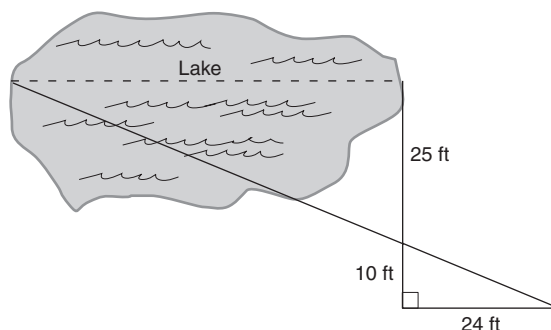
The 10-ft side corresponds to the 25-ft side. The 24-ft side of the small triangle corresponds to the lake's width.

$$\frac{10}{25} = \frac{24}{x} \quad 25(24) = 10x$$

$$600 = 10x$$

$$60 = x$$

The lake is **60 feet wide**.



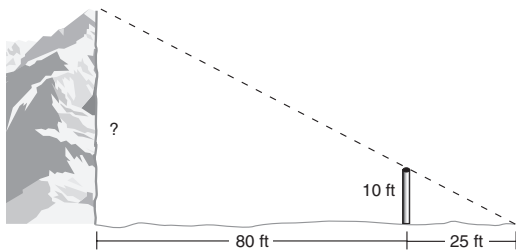
## GEOMETRY ► PRACTICE 6

Choose the **one best answer** to each question.

1. An 8-foot-tall street sign casts a 6-foot shadow at the same time that a building casts a 48-foot shadow. How many feet tall is the building?

- (1) 36  
 (2) 54  
 (3) 64  
 (4) 96  
 (5) 100

Question 2 refers to the following diagram.



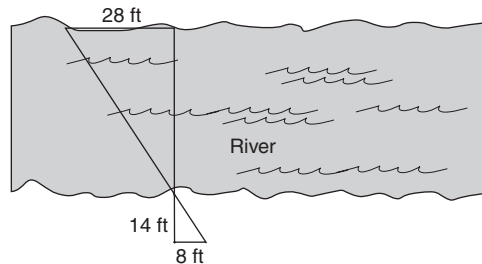
2. To find the height of a cliff, a surveyor puts a 10-foot pole in the ground, 80 feet from the base of the cliff. He then determines the point on the ground from which he can sight both the top of the pole and top of the cliff. Using the distances shown in the diagram, what is the height of the cliff?

- (1) 32  
 (2) 42  
 (3) 105  
 (4) 200  
 (5) Not enough information is given.

3. A meter stick is placed in the ground near a flagpole. At the time that the meter stick casts a shadow 2.5 meters in length, the flagpole casts a shadow 22.5 meters long. Which of the following proportions can be used to find the height of the flagpole ( $x$ ) in meters?

- (1)  $\frac{2.5}{22.5} = \frac{1}{x}$   
 (2)  $\frac{2.5}{22.5} = \frac{x}{1}$   
 (3)  $\frac{22.5}{2.5} = \frac{1}{x}$   
 (4)  $\frac{1}{2.5} = \frac{22.5}{x}$   
 (5)  $\frac{22.5}{1} = \frac{x}{2.5}$

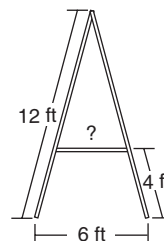
Question 4 refers to the following diagram.



4. To find the distance across a river, a surveyor marks off two similar right triangles. Using the distances shown in the diagram, what is the distance, in feet, from one bank of the river to the other?

- (1) 32  
 (2) 36  
 (3) 39  
 (4) 42  
 (5) 49

5. Phil is building a frame to hold a hammock. He wants to place a metal brace across the frame as shown in the drawing below. If he places the brace as shown in the diagram, what will be the length of the brace in feet?



- (1) 3  
 (2) 4  
 (3) 5  
 (4) 6  
 (5) 8

**Answers and explanations begin on page 683.**

# ALGEBRA PRACTICE QUESTIONS

## PART I

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

1. Which of the following expressions is equal to  $6 - 4(x + 3)$ ?

(1)  $4x + 3$   
(2)  $4x - 9$   
(3)  $-4x + 9$   
(4)  $-4x - 3$   
(5)  $-4x - 6$

2. Three increased by the product of four and a number is equal to the same number decreased by six. What is the number?

(1)  $-3$   
(2)  $-1$   
(3)  $0$   
(4)  $1$   
(5)  $3$

3. What is the product of 700 and 180,000 written in scientific notation?

(1)  $126 \times 10^9$   
(2)  $12.6 \times 10^9$   
(3)  $1.26 \times 10^8$   
(4)  $1.26 \times 10^9$   
(5)  $1.26 \times 10^{10}$

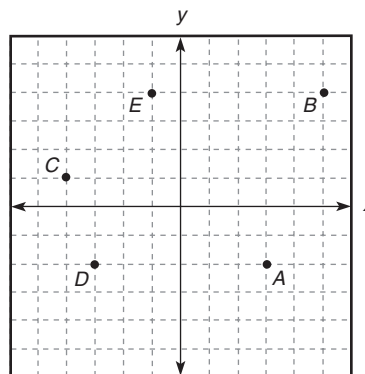
4. The ordered pair  $(-2, -1)$  is a solution to which of the following equations?

(1)  $4x + y = 7$   
(2)  $-4x - y = 7$   
(3)  $4x + y = -7$   
(4)  $4x - y = -7$   
(5)  $-4x + y = -7$

5. For a two-week period, Jan earned \$150 less than twice Tom's earnings. Together Jan and Tom earned \$1380. How much did Tom earn?

(1) \$870  
(2) \$720  
(3) \$660  
(4) \$510  
(5) \$360

Questions 6 and 7 refer to the following graph.



6. If the graph of the equation  $y = -x - 5$  were drawn on the grid, which of the points would be on the line?

(1) A  
(2) B  
(3) C  
(4) D  
(5) E

7. If a line were drawn through points B and C, what would be the slope of the line?

(1)  $-3$   
(2)  $-\frac{1}{3}$   
(3)  $\frac{1}{3}$   
(4)  $\frac{2}{3}$   
(5)  $3$

8. Samuel is paid \$350 per month plus a 10% commission on his total sales for the month. If he needs to earn at least \$2,100 per month, which of the following expressions represents the total sales ( $s$ ) Samuel needs to achieve?

(1)  $s \geq \$17,500$   
(2)  $s \leq \$17,500$   
(3)  $s \leq \$21,000$   
(4)  $s \geq \$21,000$   
(5)  $s \geq \$35,000$



9. For its Checking Plus account, a bank charges \$3.95 per month plus \$0.10 per check written over ten. The function to find the total monthly fee ( $F$ ) is  $F = \$3.95 + \$0.10(n - 10)$ , where  $n$  = number of checks written.

Greg writes 24 checks in March. How much will he pay in fees for the month?

- (1) \$6.35
- (2) \$5.35
- (3) \$2.55
- (4) \$2.40
- (5) \$1.40

10. The sum of four consecutive odd numbers is 104. What is the largest number?

- (1) 21
- (2) 23
- (3) 25
- (4) 27
- (5) 29

11. Which value for  $x$  makes the inequality  $x > 400$  true?

- (1)  $7^3$
- (2)  $4^4$
- (3)  $3^6$
- (4)  $5^3$
- (5)  $6^3$

12. Four less than the product of a number ( $x$ ) and five is equal to eight more than two added to three times the number. Which of these equations could be used to find the value of  $x$ ?

- (1)  $4 - 5x = 8 + 2 + 3x$
- (2)  $5x - 4 = 8 + 2 + 3x$
- (3)  $5x = 4 - 8 + 2 + 3x$
- (4)  $5x - 4 = 8 + 2 + 3$
- (5)  $4 - 5x = 8 + x(2 + 3)$

13. What is the value of the expression  $6(x - y) - 8x$  when  $x = -2$  and  $y = 5$ ?

- (1) -58
- (2) -26
- (3) -16
- (4) 2
- (5) 34

14. What is the next number in the sequence?

1, 7, 14, 22, ...

- (1) 29
- (2) 30
- (3) 31
- (4) 32
- (5) 33

15. What is the value of the expression shown below?

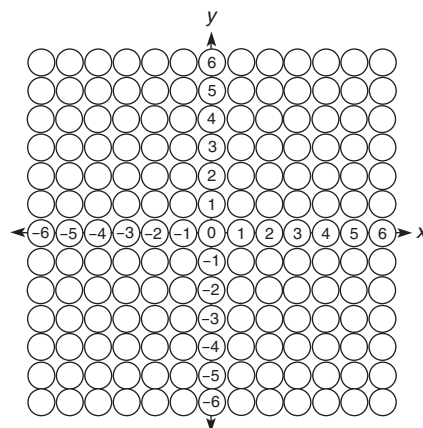
$$4^3 - \frac{3(12 + 2^2)}{6} + 5(4) - 15$$

Mark your answer in the circles on the grid below.

	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

16. The graphs of the equations  $y = x + 3$  and  $y = -2x - 3$  are drawn on a coordinate grid. At which point do the two lines intersect?

Graph your answer on the coordinate grid below.



## PART II

**Directions:** Choose the one best answer to each question. You MAY NOT use your calculator for these questions.

17. Which of the following shows the product of  $-7$  and  $x$  decreased by the sum of  $8$  and  $y$ ?

- (1)  $-7x - (8 + y)$
- (2)  $-7x - 8 + y$
- (3)  $(8 + y) - 7x$
- (4)  $7x - 8y$
- (5)  $(7 + x) - (8 + y)$

18. What are the possible solutions for the quadratic equation  $x^2 - 5x = 24$ ?

- (1)  $-8$  and  $3$
- (2)  $-6$  and  $4$
- (3)  $8$  and  $-3$
- (4)  $4$  and  $-6$
- (5)  $-12$  and  $2$

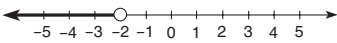
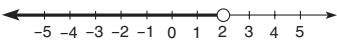
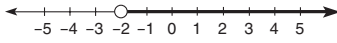
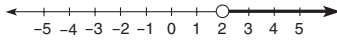
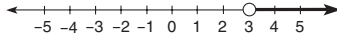
19. Cynthia is 6 times as old as Rebecca. In 6 years, Cynthia will be only 3 times as old as Rebecca. How old is Rebecca now?

- (1) 3
- (2) 4
- (3) 8
- (4) 12
- (5) 24

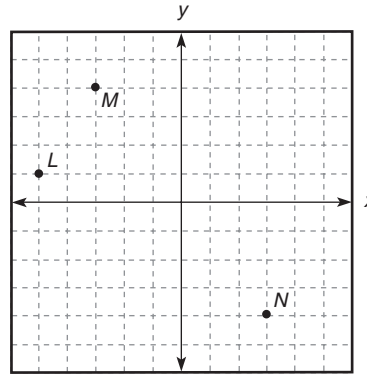
20. The graph of which equation will pass through points  $(0, -3)$  and  $(5, 7)$ ?

- (1)  $y = \frac{1}{2}x - 3$
- (2)  $y = \frac{4}{5}x - 3$
- (3)  $y = 2x - 3$
- (4)  $y = 2x + 7$
- (5)  $y = -2x + 3$

21. Which of the following graphs represents the solution set of the inequality  $-2(x - 6) > 8$ ?

- (1) 
- (2) 
- (3) 
- (4) 
- (5) 

- Questions 22 and 23 refer to the following graph.



22. Which of the following ordered pairs shows the location of point  $L$ ?

- (1)  $(-5, -1)$
- (2)  $(-5, 1)$
- (3)  $(-1, -5)$
- (4)  $(-1, 5)$
- (5)  $(1, -5)$

23. What is the distance in units from point  $N$  to point  $M$ ?

- (1) 6
- (2) 8
- (3) 10
- (4) 12
- (5) 14

24. Bob, Celia, Sam, and Daniel contributed money to buy their boss a retirement gift. Sam and Daniel each gave the same amount of money. Celia gave \$12 more than Daniel. Bob gave half as much as Celia gave. If the four workers gave a total of \$81, how much did Sam give?

- (1) \$9
- (2) \$15
- (3) \$18
- (4) \$21
- (5) \$30

25. What is the solution set of the inequality  $-7x - 4 \geq x - 28$ ?

- (1)  $x \leq 3$
- (2)  $x \geq 3$
- (3)  $x \leq -3$
- (4)  $x \geq -4$
- (5)  $x \leq 4$

26. What is the value of the expression  $5x^2 - xy + 7y^2$  when  $x = 3$  and  $y = -4$ ?

- (1)  $-79$
- (2)  $-55$
- (3)  $79$
- (4)  $145$
- (5)  $169$

27. In a recent election, Perez got 5,512 more votes than  $\frac{1}{3}$  of the leading candidate's votes. Together the two candidates received 18,072 votes. How many people voted for Perez?

- (1) 768
- (2) 6,024
- (3) 8,652
- (4) 9,420
- (5) 12,560

28. What is the value of  $x$  in the equation  $-4(x + 2) - 10 = 5x$ ?

- (1)  $x = -18$
- (2)  $x = -2$
- (3)  $x = 0$
- (4)  $x = 2$
- (5)  $x = 18$

29. Marcia counts the \$5 bills and \$10 bills in her cash register drawer. She counts a total of 35 bills with a total value of \$240. If  $x$  = the number of \$5 bills in the drawer, which of the following equations could be used to find the number of \$5 bills in the drawer?

- (1)  $\$5x + \$10x = 35$
- (2)  $\$5x + \$10(35) = \$240$
- (3)  $\$5x + \$10x + 35 = \$240$
- (4)  $\$5(35 - x) + \$10x = \$240$
- (5)  $\$5x + \$10(35 - x) = \$240$

30. The total of five consecutive numbers is 370. What is the fourth number in the sequence?

- (1) 72
- (2) 73
- (3) 74
- (4) 75
- (5) 76

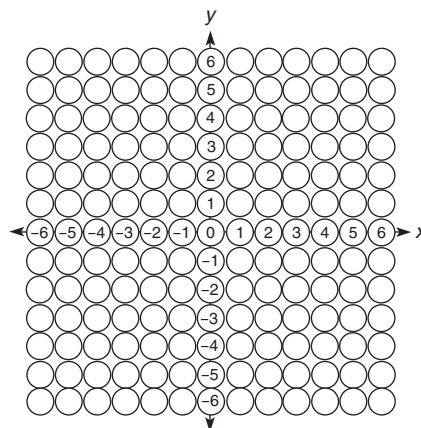
31. A baseball pitcher's earned run average ( $E$ ) is a function of the number of earned runs ( $r$ ) given up and innings pitched ( $i$ ). The function is written  $E = \frac{9r}{i}$ . What is the earned run average of a pitcher who gives up 8 runs in 18 innings?

Mark your answer in the circles on the grid below.

	/	/	/	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

32. Point  $B$  is located halfway between  $(-1, 5)$  and  $(-1, -3)$ . Name the location of point  $B$ .

Graph your answer on the coordinate grid below.



Answers and explanations begin on page 681.

# GED SOCIAL STUDIES POST-TEST

**Directions:** You will have 70 minutes to answer 50 questions on the Social Studies Test. Choose the one best answer to each question.

Question 1 refers to the following paragraph and graph.

When the value of exported goods—those sold abroad—is greater than the value of imported goods—those bought from foreign nations—there is a favorable balance of trade. On the other hand, when imports are greater than exports, there is an unfavorable balance of trade.



SOURCE: *Statistical Abstract of the United States*.

1. Which of the following statements is supported by the paragraph and the graph?
- (1) Exports equaled imports at the start of the 1990s.
  - (2) Exports exceeded imports throughout the 1990s.
  - (3) The United States had a favorable merchandise balance of trade during the 1990s.
  - (4) The United States had an unfavorable merchandise balance of trade during the 1990s.
  - (5) The unfavorable merchandise balance of trade steadily decreased during the 1990s.

2. The Second Amendment to the U.S. Constitution was ratified in 1791. It states: “A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed.”

Which of the following modern organizations cites this amendment to support its goals and political positions?

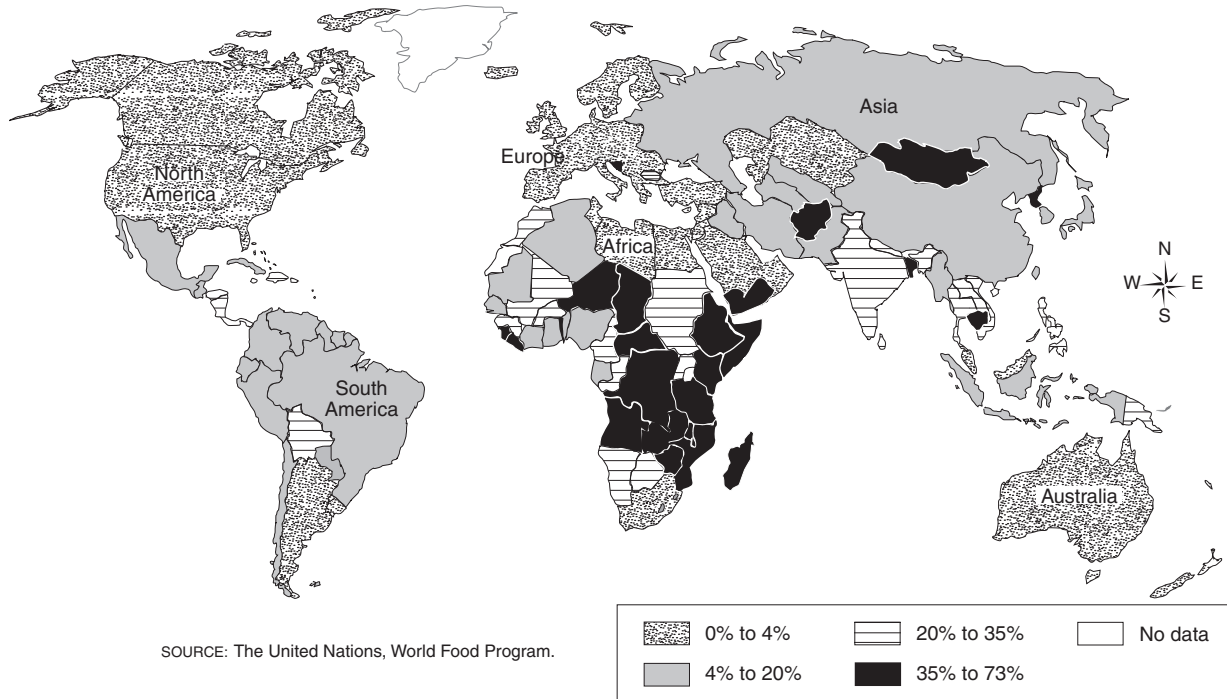
- (1) the Council of State Governments
  - (2) the National Right to Life Political Action Committee
  - (3) the National Taxpayers’ Union
  - (4) the National Rifle Association
  - (5) the United States Chamber of Commerce
3. In the late 1800s, industrialization caused a large-scale migration from rural to urban areas in the United States. Parents who moved to cities with their children left behind the social support of their extended families. In addition, city families found that children, who were an asset on the farm because they could work at an early age, were more of an economic drawback in the city. As a consequence, the birthrate dropped during this period and average family size shrank.

Which of the following is the best summary of this passage?

- (1) Industrialization led to increased urbanization in the late 1800s.
- (2) City families lost the social support of their extended families back on the farm.
- (3) Industrialization and urbanization caused many changes in family life in the late 1800s.
- (4) The U.S. birthrate dropped in the late 1800s.
- (5) In the late 1800s, average family size shrank due to the fall in the birthrate.

Questions 4 through 6 refer to the following map.

Percentage of Undernourished People Worldwide



SOURCE: The United Nations, World Food Program.

4. According to the map, what is the percentage range of people in the United States who do not get enough food and nutrients?
- (1) 0% to 4%
  - (2) 4% to 20%
  - (3) 20% to 35%
  - (4) 35% to 73%
  - (5) more than 73%
5. Which of the following people would have the greatest use for this map?
- (1) a nutritionist in a hospital
  - (2) a person who heads a relief organization
  - (3) a person traveling around the world
  - (4) a farmer in the United States
  - (5) a math professor from Central America
6. Which of the following statements is supported by the information on the map?
- (1) All areas with more than 35% of the population undernourished are inland nations.
  - (2) World hunger would disappear if food were distributed more fairly.
  - (3) There are approximately 830 million undernourished people worldwide.
  - (4) There are no areas of hunger in Europe or Australia.
  - (5) Hunger is a major problem in many countries in Africa.

Question 7 refers to the following excerpt from a credit card bill.

**In Case of Errors or Questions About Your Bill**

If you think your bill is wrong, or you need more information about a transaction, write us on a separate sheet at the address shown on the front of this statement. We must hear from you no later than 60 days after we sent you the first bill on which the error or problem appeared. You can telephone us, but doing so will not preserve your rights.

You do not have to pay any amount in question while we are investigating, but you are obligated to pay the parts of your bill that are not in question.

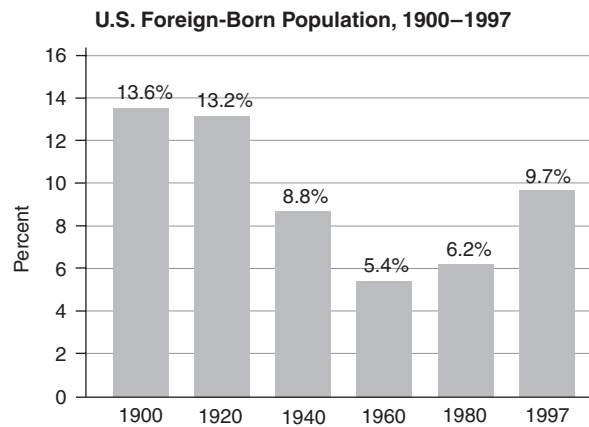
7. The Hampsens received their credit card bill for \$279.45 dated July 25. They noticed that one transaction, a pair of sneakers costing \$69, was posted twice. The Hampsens normally pay their balance in full. What should they do in this situation?
- (1) Pay \$279.45, and call the store where they bought the sneakers to tell them about the double billing.
  - (2) Pay \$210.45, and call the credit card company within 60 days to tell them about the double billing.
  - (3) Pay \$210.45, and write to the credit card company within 60 days to tell them about the double billing.
  - (4) Pay \$210.45, and call the store where they bought the sneakers and ask them to issue a credit for \$69.
  - (5) Pay nothing, and write to the credit card company within 60 days to tell them about the double billing.

8. Comparative advantage is the ability to produce goods and services at a lower cost than the cost at which others can produce them.

When a company has a comparative advantage with a particular product, what is the result?

- (1) The company can advertise its product to a specialized set of consumers.
- (2) The company can sell the product at a lower price than other companies can.
- (3) The company can sell the product at a higher price than other companies can.
- (4) The company can expand its workforce.
- (5) The company can lay off a percentage of its workforce.

Question 9 refers to the following graph.



SOURCE: U.S. Bureau of the Census.

9. Which of the following best describes the change in the percentage of foreign-born people in the United States since 1960?
- (1) In 1960, only 6.2 percent of the U.S. population was foreign born.
  - (2) Since 1960, the percentage of foreign-born people has been on an upward trend.
  - (3) Since 1960, the percentage of foreign-born people has been on a downward trend.
  - (4) Since 1960, the percentage of foreign-born people has held steady.
  - (5) Since 1960, the percentage of foreign-born people has not exceeded 5 percent.



---

Questions 10 and 11 refer to the following chart.

**Acts of Parliament Directed at the American Colonies**

Act	Description
Revenue Act of 1764 (Sugar Act)	Imposed duties (tariffs) on foreign sugar and luxuries to raise money for Great Britain
Quartering Act of 1765	Required colonists to provide food and shelter for British soldiers
Stamp Act of 1765	Required colonists to purchase revenue stamps for all important documents, including legal documents, newspapers, and ads
Declaratory Act of 1766	Asserted the right of Parliament to make laws for the colonies
Townshend Acts of 1767	Imposed new duties on the import of tea, glass, and paper

10. How did the Declaratory Act differ from all the other acts of Parliament shown in the chart?
- (1) It did not involve the quartering of British soldiers.
  - (2) It related only to the import of luxury goods.
  - (3) It was directed only at the New England colonies.
  - (4) It did not impose direct economic costs on the colonists.
  - (5) It was enacted long after the other acts of Parliament.

11. The information in this chart would have been most useful for the writing of which of the following documents?
- (1) The Declaration of Independence, which explained why the colonies broke away from Great Britain
  - (2) The Articles of Confederation, which established a central government consisting of a congress
  - (3) The U.S. Constitution, which established the structure of government for the newly independent nation
  - (4) The Federalist Papers, a series of 85 essays written to persuade the states to ratify the Constitution
  - (5) Washington's Farewell Address, in which he warned the new nation of policies and practices he thought unwise

- 
12. The civil rights movement of the 1950s and 1960s inspired historians to reinterpret slavery's impact on U.S. society in general and on African Americans in particular. One interpretation that emerged was that slaves and owners were always in conflict and that slavery was destructive. The extent of slavery's destructiveness was debated. Some historians argued that slavery destroyed the culture and self-respect of the slaves and their descendants. Others thought that slaves overcame hardship by developing a unique African American culture that included, among many different things, strong religious and musical traditions.

Based on the paragraph, which of the following statements is an opinion rather than a fact?

- (1) The civil rights movement took place during the middle of the twentieth century.
- (2) The civil rights movement caused historians to take another look at slavery.
- (3) Historians debated slavery's negative effects on slaves and their descendants.
- (4) Slavery destroyed the culture of the slaves, diminishing their self-respect.
- (5) Modern African American culture includes many different forms of music.

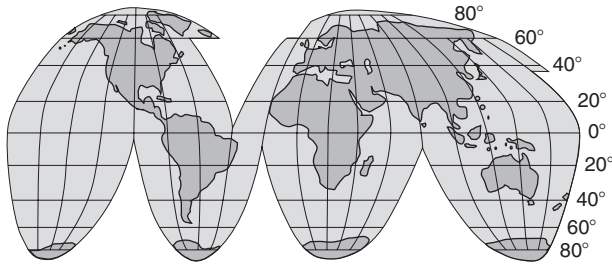
Questions 13 through 15 refer to the following paragraph and maps.

Mapmakers have devised many solutions to the problem of projecting the curved surface of Earth onto a flat piece of paper. However, all map projections involve some distortion, and each type of projection has advantages and disadvantages. Two types of projections are shown here.

**Mercator Projection**



**Interrupted Projection**



13. Approximately where is there the least distortion on these projections?

- (1) at 80° north and south latitude
- (2) at 60° north and south latitude
- (3) at 40° north and south latitude
- (4) at 20° north and south latitude
- (5) at 0° latitude

14. What is one of the main differences between the Mercator projection and the interrupted projection?

- (1) The Mercator projection distorts the sizes of land masses near the North Pole, and the interrupted projection does not.
- (2) The Mercator projection cuts apart the oceans, and the interrupted projection cuts apart the land masses.
- (3) The Mercator projection gives an accurate view of the South Pole area, and the interrupted projection does not.
- (4) The Mercator projection shows each of the oceans, and the interrupted projection does not.
- (5) The Mercator projection shows each of the continents, and the interrupted projection does not.

15. A sailor who needed to plan a rough course for an around-the-world race decided to use the interrupted projection. What was wrong with his decision?

- (1) The interrupted projection distorts distances across the continents at mid-latitudes.
- (2) The interrupted projection distorts distances across the oceans.
- (3) The interrupted projection distorts the shapes of mid-latitude land masses.
- (4) The interrupted projection distorts the shapes of polar land masses.
- (5) The interrupted projection shows only a few of the world's oceans.



Questions 16 and 17 refer to the following map.

**Forced Resettlement of American Indians, 1830s**



16. Which American Indian tribe was moved the farthest from its tribal lands?

- (1) the Sauk/Fox
- (2) the Cherokee
- (3) the Chickasaw
- (4) the Choctaw
- (5) the Seminole

17. Which of the following is the most likely reason that American Indians were forcibly relocated in the 1830s?

- (1) Whites wanted lands in the Kansas and Nebraska territory for settlement.
- (2) Whites wanted to take over Indian lands in the eastern states.
- (3) Indians of different tribes wanted to settle in a single Indian territory.
- (4) Indians in the eastern states wanted to look for gold in the West.
- (5) Indians in the eastern states did not want to integrate into white society.

18. During the Neolithic Age (about 8000 B.C. to 3500 B.C.), many societies domesticated plants and animals. One result of animal domestication was a new way of life—pastoralism. In pastoralism, groups of people move from place to place seeking new grazing lands for their animals. Pastoralism has remained the main alternative to settlement agriculture, although in recent times the growth of settled populations has encroached on pastoral lands.

Which of the following is an example of a pastoral society?

- (1) the Bedouin, who are a nomadic herding people of Saudi Arabia
- (2) the Kikuyu, who live on large family farming homesteads in Kenya
- (3) the Amish, who preserve traditional farming methods in the United States
- (4) the Palestinian Arabs, many of whom live in refugee camps
- (5) the mestizos, Mexican people of mixed Native American and European ancestry

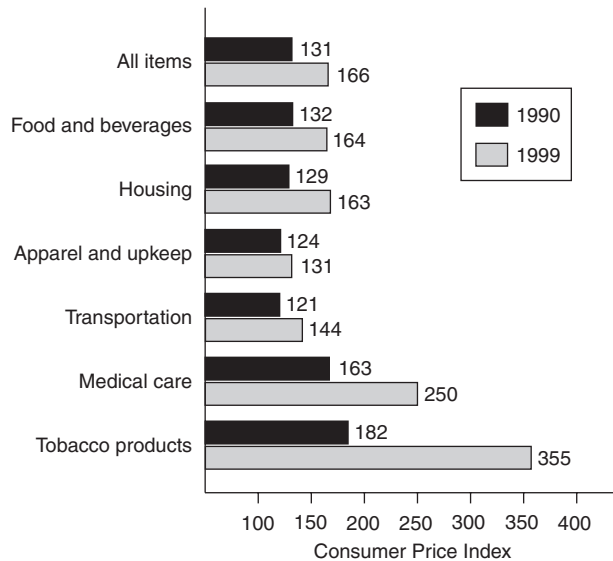
19. Once farmers settled beyond the Appalachians in the early 1800s, it became apparent that better transportation of farm produce and trade goods was needed between the East and what is now the Midwest. Constructing decent roads over the Appalachians was one of the first attempts to address this problem.

Which of the following also increased trade between the East and the Midwest?

- (1) dredging deep-water ports on the East Coast
- (2) building the Erie Canal from the Great Lakes to the Hudson River in New York
- (3) prohibiting slavery north of 36° 30' north latitude, the westward extension of Missouri's southern border
- (4) admitting Michigan as a state in 1837
- (5) purchasing Alaska from Russia for \$7.2 million

Question 20 refers to the following graph.

**Consumer Price Index for Urban Consumers, 1990 and 1999**  
(1982 to 1984 = 100)



SOURCE: U.S. Bureau of the Census.

20. Which of the following statements is supported by the data in the graph?

- (1) Most of the increased cost of tobacco products was due to increased taxation of these products.
- (2) During this period in which the consumer price index rose, wages rose to keep pace with prices.
- (3) The cost of food and beverages for an urban consumer almost tripled between 1982–1984 and 1999.
- (4) The costs of medical care and tobacco products increased far more than the cost of other items in the 1990s.
- (5) Among the items listed, transportation showed the least increase in the period between 1990 and 1999.

21. During the Age of Imperialism (1870 to 1914), the nations of Europe and the United States dominated the political, economic, and cultural life of many countries in Africa, Asia, and Latin America.

Which of the following is an example of imperialism?

- (1) Communists under Mao Zedong won control of mainland China after World War II.
- (2) Fifteen independent nations, of which Russia is the largest, were formed after the breakup of the Soviet Union.
- (3) The United States gained influence over Panama through the building and running of the Panama Canal.
- (4) After gaining independence from Great Britain, East Pakistan broke away from West Pakistan and formed the nation of Bangladesh.
- (5) In the mid-1800s, the Kingdom of Hungary was established as a monarchy separate from that of the empire of Austria.

22. Areas with average or above average rainfall have humid soils. Humid soils are usually fertile because they contain decaying plant matter. However, humid soils in northern coniferous regions of the United States are not fertile. Acid from the pine needles that cover the ground leaches into the soil, making it unsuitable for agriculture. In the humid, subtropical regions of the southeast, heavy rainfall washes large amounts of minerals from the soil. Growing crops there usually requires heavy use of fertilizers.

Which of the following is a conclusion based on the paragraph rather than a detail?

- (1) Humid soils have organic material in them.
- (2) Except for soils in northern coniferous regions, humid soils can be used or modified for crops.
- (3) The pine needle ground cover of coniferous regions makes the soil acidic.
- (4) Rain leaches minerals from the soil in the southeastern United States.
- (5) In the southeast, farmers add fertilizers to soil lacking in minerals.

Question 23 and 24 refer to the following passage.

In March 1965, blacks were attacked by state troopers when they first attempted to march from Selma, Alabama, to the state capital, Montgomery, to present Governor Wallace with their complaints about civil rights violations. After several tries, they completed the five-day, 54-mile march along Interstate 80, under the protection of Army troops and the National Guard. Black sharecroppers, who had been evicted from their land for trying to register to vote, built a settlement called Tent City along the highway. The march to Montgomery, which was televised throughout the nation, helped ensure passage of the 1965 Civil Rights Act.

Today that stretch of highway, a national historic trail, is the subject of controversy. In 1998 the local county commission, which has a black majority, approved plans to build a landfill 500 feet off the highway in Lowndes County. Part of the agreement is that the developer will share the revenue with the county, where nearly 40 percent of the people live below the poverty line. The plan has drawn opposition from those who feel that a landfill near the historic highway is an insult. Bob Mants, a former civil rights worker who heads the Lowndes County Friends of the Trail, says, "You can't commemorate it on the one hand and desecrate it on the other." At present, plans for the landfill are on hold as opponents take their case to court.

23. Based on the passage, which of the following statements is an opinion rather than a fact?
- (1) The march from Selma to Montgomery helped get the Civil Rights Act of 1965 passed.
  - (2) Evicted black sharecroppers built Tent City alongside the highway.
  - (3) It took marchers 5 days to walk the 54 miles between Selma and Montgomery.
  - (4) Establishing a landfill near a historic site is an insult to the memory of what took place there.
  - (5) Opponents of the landfill have stopped its progress by taking their case to court.

24. The controversy over the landfill has united blacks and whites on both sides of the issue.

Which values are pitted against one another in this conflict?

- (1) individualism versus group welfare
- (2) the right to life versus protecting the environment
- (3) freedom of speech versus free enterprise
- (4) civil rights versus law and order
- (5) present-day economic benefit versus respect for the past

Question 25 refers to the following cartoon.



© Wayne Stayskal. Reprinted by permission of Wayne Stayskal.

25. With which of the following opinions would the cartoonist be most likely to agree?
- (1) People shouldn't have to stand around waiting to see their elected representatives.
  - (2) Senators should pay attention to special interest groups as well as to voters.
  - (3) Special interest groups have too much influence with members of Congress.
  - (4) Senators are nicer to their constituents than are members of the House.
  - (5) Senators and members of the House of Representatives should work together more closely.

Questions 26 and 27 refer to the map below.



26. During World War II, the United States, Great Britain, and the Soviet Union were allied in the fight against Nazi Germany. The Soviet Union had a communist government and the other Allies did not. Toward the end of World War II, the British and Americans approached Germany from the west, as the Soviets approached Germany from the east. Soon Germany surrendered to the Allies.

Based on the paragraph and the map, what was one result of this strategy?

- (1) Fighting between communists and non-communists raged in Greece.
- (2) Finland became a member of NATO.
- (3) Switzerland remained neutral both during and after the war.
- (4) Germany was divided into two parts, West Germany and East Germany.
- (5) Northern Ireland remained a part of Great Britain, although Ireland became an independent nation.

27. NATO, which stands for the North American Treaty Organization, was a military alliance of noncommunist nations in Europe and North America. The Warsaw Pact was an alliance of communist nations in Europe.

Which of the following is a conclusion based on this information and on the map rather than a detail?

- (1) Great Britain was a member of the NATO alliance.
- (2) All the Warsaw Pact nations were located in eastern Europe.
- (3) Norway was a member of NATO.
- (4) Romania was a Warsaw Pact nation.
- (5) Austria was neutral after World War II.

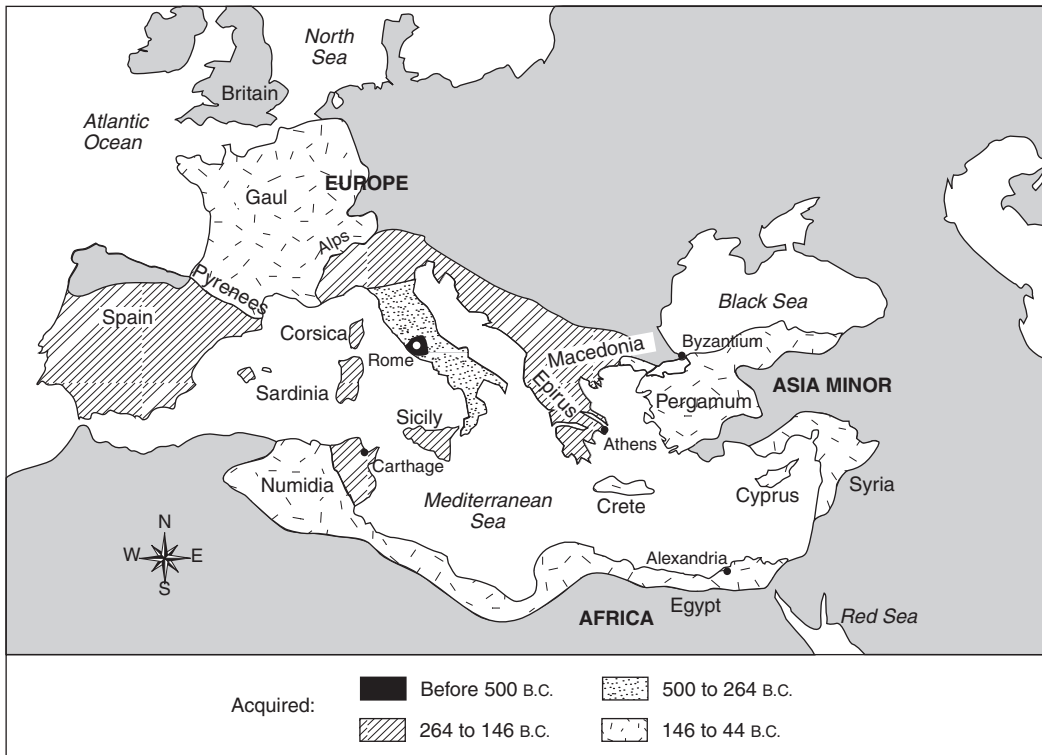
28. Constitutional guarantees of fairness and equality under the law, our basic civil liberties, are called due process of law. The Fifth and Fourteenth Amendments state that government shall not deprive anyone of "life, liberty, or property, without due process of law." The Fifth Amendment protects people from actions of the federal government. The Fourteenth, protects people specifically from actions of governments of the individual states.

What is a main difference between the Fifth and Fourteenth Amendments?

- (1) The Fifth Amendment applies to adults, and the Fourteenth Amendment, to children.
- (2) The Fifth Amendment applies to due process, and the Fourteenth Amendment, to freedom of speech.
- (3) The Fifth Amendment applies to liberty, and the Fourteenth Amendment, to property.
- (4) The Fifth Amendment applies to the federal government, and the Fourteenth Amendment, to state governments.
- (5) The Fifth Amendment applies to life, and the Fourteenth Amendment, to liberty.

Questions 29 and 30 refer to the following map.

The Roman Empire, 500 B.C. to 44 B.C.



29. During which time period did the Roman Empire gain the most territory in Asia Minor?

- (1) before 500 B.C.
- (2) between 500 and 264 B.C.
- (3) between 264 and 146 B.C.
- (4) between 146 and 44 B.C.
- (5) after 44 B.C.

30. Which of the following conclusions is supported by the information on the map?

- (1) Rome granted citizenship to the Latin-speaking peoples who lived on the Italian peninsula.
- (2) Before 264 B.C., Rome conquered through overland military campaigns; later conquests were made by navies as well.
- (3) Numidia was added to the Roman Empire before the island of Sicily was.
- (4) Corsica, Crete, and Cyprus were conquered by the Romans during the same military campaign.
- (5) Hannibal marched from Carthage to Italy by way of Spain, crossing the Pyrenees into Gaul and the Alps into northern Italy.



Question 31 refers to the following chart.

**The Effect of World War II on Industry**

Measure	1939	1940	1941
Index of manufacturing output (1939 = 100)	100	116	154
Corporate profits before taxes	\$6.4 billion	\$9.3 billion	\$17 billion
Corporate profits after taxes	\$5 billion	\$6.5 billion	\$9.4 billion

SOURCE: Fute, Gilbert C., and Reese, Jim E. *An Economic History of the United States*.

31. Why did the war have the effect on industry that is indicated by the chart?

- (1) Even before the United States entered the war, corporate profits had increased sharply.
- (2) Manufacturing output increased by over 50 percent in two years.
- (3) The war created a huge demand for military equipment and supplies.
- (4) The war created a need for large increases in corporate tax revenue.
- (5) With men gone to serve as soldiers, more women were employed in factories.

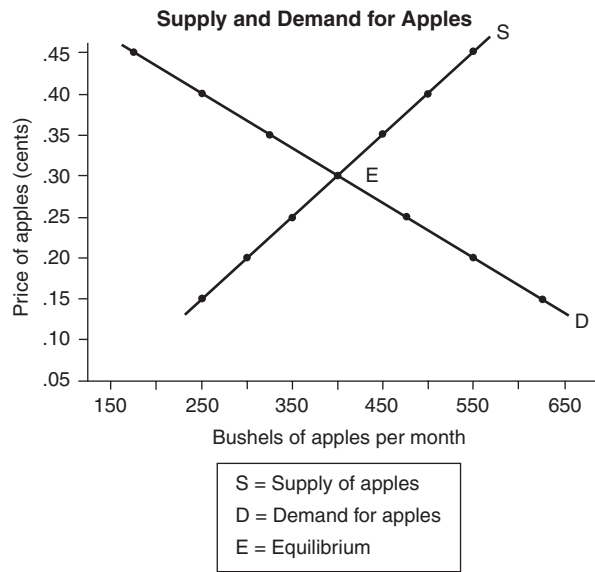
32. The U.S. president has a great deal of influence over foreign policy. In part, this is because international relations often require quick and decisive action, which is best undertaken by an individual. In times of foreign crisis, the public usually rallies to the support of the president, at least at first.

Which of the following values probably underlies Americans' initial approval of a president's emergency foreign policy actions?

- (1) individualism
- (2) patriotism
- (3) imperialism
- (4) self-expression
- (5) self-sacrifice

Questions 33 and 34 refer to the following paragraph and graph.

The market price of a product tends to change in a way that brings supply and demand into balance, a condition called equilibrium. This is illustrated in the graph below, which shows supply and demand for apples.



33. According to this graph, what is the market price of apples—also known as the price at equilibrium?

- (1) 45 cents
- (2) 40 cents
- (3) 30 cents
- (4) 20 cents
- (5) 15 cents

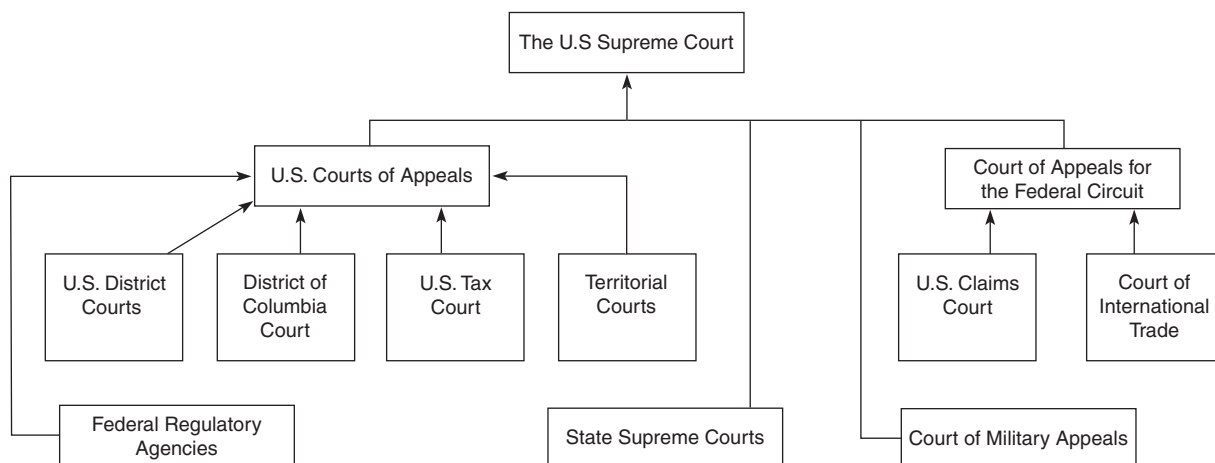
34. Which of the following would result if part of the apple crop were destroyed but demand remained the same?

- (1) Supply would increase.
- (2) Supply would remain the same.
- (3) The market price would remain the same.
- (4) The market price would go down.
- (5) The market price would go up.

Questions 35 through 37 refer to the following paragraph and diagram.

Most cases that arise under federal law are tried in the federal court system. The federal court system has several levels of courts and several routes by which cases may be appealed to a higher court.

**Routing Cases Through the Federal Court System**



35. If cases are not resolved in any of the lower federal courts, to which court may they eventually, finally be appealed?
- (1) the Supreme Court of the United States
  - (2) the United States Court of Appeals
  - (3) a state's Supreme Court
  - (4) the Court of Appeals for the Federal Circuit
  - (5) the Court of Military Appeals
36. A U.S. import-export firm files a lawsuit against a foreign trading company. In which court is the suit most likely to be filed?
- (1) the United States Claims Court
  - (2) the United States Court of Appeals
  - (3) the Court of International Trade
  - (4) the United States Tax Court
  - (5) the United States District Court
37. The U.S. Constitution established only the Supreme Court, but it gave Congress the power to create inferior (lower) federal courts. Which is the most likely reason that Congress established other federal courts?
- (1) The justices of the U.S. Supreme Court were not well versed enough in the law to handle all federal cases.
  - (2) The volume and variety of federal cases were too great for a single court to handle.
  - (3) A system of inferior federal courts gave the United States prestige in the eyes of the rest of the world.
  - (4) The Supreme Court was able to both hear original cases and take cases on appeal.
  - (5) The Supreme Court's power to interpret the Constitution was established in *Marbury v. Madison*.

Questions 38 and 39 refer to the following passage.

American citizens get most of their political information and news from the mass media—methods of communication that can reach most people and that most people can afford. Newspapers, magazines, radio, and television are all types of mass media.

Many critics of the media think that the mass media's coverage is biased in favor of liberal views. Indeed, surveys show that reporters and editors are more Democratic and liberal than the population in general. However, research studies have not shown a significant or consistent liberal bias in the reporting of political news. For example, a study of media coverage of the 2000 presidential campaign showed that Democratic candidate Al Gore got more negative coverage than did Republican candidate George W. Bush. In addition, whatever the personal views of journalists, a balancing, conservative influence is exerted by media executives and stockholders of media corporations, who are interested in profits.

38. According to the passage, which of the following statements is an opinion?

- (1) The mass media reach most of the U.S. population.
- (2) Newspapers, magazines, radio, and television are all part of the mass media.
- (3) There are more Democrats and liberals among journalists than in the general public.
- (4) The mass media's coverage of political news has a consistent liberal bias.
- (5) Media executives and stockholders tend to exert a conservative influence.

39. Which of the following is most likely to become part of the mass media in the future?

- (1) cellular phones
- (2) personal digital assistants
- (3) the Internet
- (4) pagers
- (5) digital video disks

Question 40 refers to the following paragraph and map.

During World War II, the U.S. government feared that Japanese Americans on the West Coast might pose a danger to American security. Consequently, about 110,000 Japanese Americans were relocated from their homes there to internment camps.

Internment Camps for Japanese Americans, 1942–1945



40. Which of the following conclusions is supported by the paragraph and the map?

- (1) More Japanese-American internment camps were located in Arkansas than in any other state.
- (2) Japanese Americans in California lost more property than those in Washington or Oregon.
- (3) There were no internment camps in the states of California, Nevada, Montana, or New Mexico.
- (4) All of the camps were located inland to make it difficult for any Japanese American to communicate with Japanese offshore.
- (5) The government did not have specific evidence that Japanese Americans posed a danger to American security.



---

Questions 41 through 43 refer to the following passage.

Thousands of years ago, people bartered to meet their needs. For example, if a man caught two fish, he might barter, or exchange, them for a neighbor's basket. Bartering allowed for the exchange of goods and services, but it had disadvantages. First, when two people barter, each must have something the other wants or there is no trade. Second, they must agree on the relative value of the items. Finally, it's not always possible to save something and barter it at a later date. The man with the fish needed to barter it right away or the value of the fish would drop.

Money was invented to solve bartering problems. Money has several advantages over bartering. First, it is a widely accepted way to exchange goods and services. Not everyone will accept a fish or a basket for goods or labor, but everyone will accept money. Second, money allows people to compare the value of goods and services. If one bracelet is priced at \$59 and another at \$599, it is immediately clear which is worth more. Third, money is a way to store value. Money does not have to be spent right away; it can be saved and spent later.

41. What is bartering?

- (1) trading goods and services for other goods and services
- (2) stockpiling goods that will increase in value
- (3) selling a good or service for a particular amount of money
- (4) negotiating the value of a particular good or service
- (5) buying a good or service, adding value to it, and reselling it

42. What do bartering and the use of money have in common?

- (1) Both necessarily involve trading items for other items.
- (2) Both necessarily have time limits on their usefulness.
- (3) Both allow for the easy comparison of value.
- (4) Both are ways to store value.
- (5) Both are ways to exchange goods and services.

43. Which of the following statements is a conclusion from the passage rather than a supporting detail?

- (1) Money has several advantages over bartering.
- (2) Money is widely accepted in economic transactions.
- (3) Money allows for fairly accurate determination of worth.
- (4) In bartering, each person must have what the other wants.
- (5) In bartering, goods can lose value with time.

Questions 44 and 45 refer to the following chart.

**Important Political Documents Preceding the Declaration of Independence and the U.S. Constitution**

Year	Document	Description
1215	Magna Carta	Limited the power of the English king and granted rights to the nobles
1620	Mayflower Compact	Set rules by which the Pilgrims would govern themselves in Plymouth colony
1628	Petition of Right	Limited the English king's powers further
1636	Great Fundamentals	Established the first basic system of laws in the English colonies, in Massachusetts Bay Colony
1688	English Bill of Rights	Declared that the king rules with the consent of the people's representatives in Parliament; granted ordinary people certain rights

44. Which document first set limits on the British monarch's powers?

- (1) the Magna Carta
- (2) the Mayflower Compact
- (3) the Petition of Right
- (4) the Great Fundamentals
- (5) the English Bill of Rights

45. What do the Mayflower Compact and the Great Fundamentals have in common?

- (1) Both limited the power of the king.
- (2) Both granted rights to the nobles.
- (3) Both established a parliament.
- (4) Both established methods of self-government in English colonies.
- (5) Both applied to the government in England.

46. One of the major grievances the American colonists had against the British was that the British taxed the colonists without granting them representation in the British Parliament. Part of the Declaration of Independence is a list of political and economic rights that American colonists complained that the British king had deprived them of.

By which of the following documents were the writers of the Declaration probably most influenced as they drafted their list?

- (1) the Magna Carta
- (2) the Mayflower Compact
- (3) the Petition of Right
- (4) the Great Fundamentals
- (5) the English Bill of Rights

47. Like the ancient Chinese, the ancient Greeks thought that a sound political system and well-established social relationships were necessary for a stable society. Greek rule was decentralized, and as a result, many political structures coexisted. In contrast, Chinese rule was largely centralized, and a single political system prevailed. The Greeks placed more value on councils, participation, and law; the Chinese, on bureaucracy, hierarchy, and rules.

Based on the paragraph, what did the ancient Greeks and the ancient Chinese have in common in regard to politics and government?

- (1) Both emphasized the participation of citizens.
- (2) Both governed through a hierarchical bureaucracy.
- (3) Both valued a stable political framework for society.
- (4) Both had centralized councils.
- (5) Both had decentralized political systems.

Question 48 refers to the following chart.

**Traffic Delays in the Largest Metropolitan Areas**

Metropolitan Area	Annual Hours Delayed per Person	Percent of Workers Not Driving
New York	34	39.3%
Los Angeles	56	12.6%
Chicago	34	23%
Washington, D.C.	46	23.1%
San Francisco	42	23.8%

48. Which of the following statements is a conclusion based on the chart rather than a detail?
- (1) Almost 40 percent of workers in the New York area do not use cars to commute.
  - (2) Los Angeles has the worst traffic delays because such a large percentage of workers drive there.
  - (3) In Washington the average person spends 46 hours per year delayed in traffic jams.
  - (4) About one-quarter of workers in the Chicago area do not drive to work.
  - (5) In San Francisco the average person loses 42 hours per year stuck in traffic.

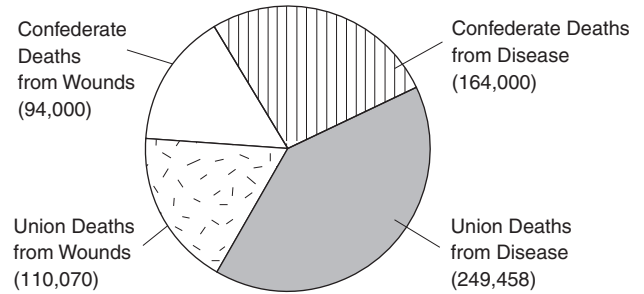
49. A franchise is a business arrangement in which a large corporation allows an individual or group to operate an outlet, using its well-known name and selling its goods. In return, the franchisee pays an up-front fee and a percent of sales revenues to the corporation.

Which of the following is a franchise?

- (1) Middletown General Store, a mom-and-pop operation
- (2) General Motors, a corporation that manufactures cars and other products
- (3) Dewey & Lopez, an accounting firm run by partners
- (4) McDonald's, a chain of fast-food restaurants run by individuals
- (5) Get Organized!, a consulting business run out of a person's home

Question 50 refers to the following graph.

**Civil War Casualties**



50. Which of the following conclusions is supported by the data in the graph?
- (1) The Confederate Army suffered more casualties than the Union Army.
  - (2) About the same number of Confederate and Union soldiers died of disease.
  - (3) About twice as many Civil War soldiers died of disease as died of wounds.
  - (4) Almost as many civilians died during the Civil War as soldiers.
  - (5) About twice as many Union soldiers died of wounds as did Confederate soldiers.

**Answers and explanations start on page 617.**

# NONFICTION PRACTICE QUESTIONS

Questions 1 through 4 refer to the following excerpt from an autobiography.

## ARE LECIA AND HER SISTER GOOD STUDENTS?

- That fall my school career didn't go much better. I got suspended from my second-grade class twice, first for biting a kid named Phyllis who wasn't, to my mind,
- (5) getting her scissors out fast enough to comply with the teacher, then again for breaking my plastic ruler over the head of a boy named Sammy Joe Tyler, whom I adored. A pale blue knot rose through the blond stubble of his crew cut. Both times I got sent to the principal, a handsome ex-football coach named Frank Doleman who let Lecia and me call him Uncle Frank. (Lecia and I had impressed Uncle Frank by both learning to read pretty much without instruction before we were three. Mother took us each down to his office in turn, and we each dutifully read the front page of the day's paper out loud to him, so he could be sure it wasn't just some story we'd memorized.)

- He let me stay in his office playing chess all afternoon with whoever wandered in. He loved pitting me against particularly lunkheaded fifth- and sixth-grade boys
- (25) who'd been sent down for paddlings they never got. He'd try to use my whipping them at chess to make them nervous about how dumb they were. "Now this little bitty old second-grader here took you clean in six plays. Don't you reckon you need to be listening to Miss Vilimez instead of cutting up?" When Mrs. Hess led me solemnly down the hall to Frank Doleman's office, I would pretend to cry, but thought instead
- (30) about Brer Rabbit as he was being thrown into the briar patch where he'd been born and raised, and screaming *Please don't throw me in that briar patch!*

From *The Liar's Club* by Mary Karr, New York: Penguin Books, 1995.

1. If the writer had attended an elementary school dance, which of the following might she have done?
  - (1) created a scene just to be funny
  - (2) made fun of everyone as they danced
  - (3) sat and played chess with the boys
  - (4) been too shy to dance with anyone
  - (5) hit a boy in the arm to get his attention
2. What is meant by the statement "I . . . thought instead about Brer Rabbit as he was being thrown into the briar patch where he'd been born and raised and screaming *Please don't throw me in that briar patch!*" (lines 33–38)?
  - (1) She was so upset that she wanted to scream.
  - (2) She was just pretending she didn't want to go to the principal's office.
  - (3) She was thinking of stories she might read in the principal's office.
  - (4) She hoped the teacher would let her back in class if she pleaded with her.
  - (5) She was afraid of what would happen in the principal's office.
3. What type of principal was Frank Doleman?
  - (1) strict
  - (2) fair
  - (3) ineffective
  - (4) unusual
  - (5) mean
4. Later in the autobiography, the narrator describes herself as "small-boned and skinny, but more than able to make up for that."

Based on this description and the excerpt, which of the following best describes the narrator?

  - (1) confident
  - (2) serious
  - (3) happy-go-lucky
  - (4) friendly
  - (5) hopeful

---

Questions 5 through 9 refer to this review.

### WHAT MAKES THIS ARTWORK UNIQUE?

Sol LeWitt's work doesn't look the way radical art is supposed to look. Many of the wall drawings in his retrospective at the Whitney are exuberant and lush, even gorgeous. "Splotch," the title of a recent series, has a comic-book sound, and each of these gooey fiberglass clusters suggests a family, forest, city, or cave dwelling modeled by a class of intent and unpredictable kids. Even the ascetically spare white cubic sculptures that helped establish LeWitt's reputation in the seventies as a pioneering Conceptual artist are as much jungle gyms as they are geometers' tools. Fantasy and play are no less welcome here than analysis and rigor. Children and adults, hedonists and mathematicians have a place in LeWitt's universe.

- These works do not exclude. This expansiveness is, in fact, essential to LeWitt's radical ambition. He studied early-twentieth-century modernist developments such as Russian Constructivism, De Stijl, and the Bauhaus, all driven by a utopian hope that art could change the world. Kasimir Malevich and Piet Mondrian believed their stripped-down geometrical abstractions could initiate new ways of seeing—and with them, new ways of being. LeWitt, born in Hartford in 1928, the child of Russian Jews, also wanted to begin again. "Our idea was to re-create art, to start from square one," he told former museum director Martin Friedman. For him and other members of his generation, the emotionalism and grandiosity of Abstract Expressionism were dead ends. He knew that the impact of European abstract art was limited because it was accessible only to a select few.

From "High Concept" by Michael Brenson, *New York*, January 1, 2001.

5. According to the review, which of the following is the best description of LeWitt's artwork?
  - (1) playful yet skilled
  - (2) immature and amateurish
  - (3) emotionally dead
  - (4) impractical
  - (5) appreciated by the few
6. If LeWitt's art "doesn't look the way radical art is supposed to look" (lines 1–2), then how can you conclude that most radical art looks to the reviewer?
  - (1) gorgeous and lush
  - (2) childlike and light-hearted
  - (3) spare and serious
  - (4) realistic and traditional
  - (5) intricate and detailed
7. What is "LeWitt's radical ambition" (line 21)?
  - (1) to criticize other artists for trying to change the world
  - (2) to transform wall drawings from the usual dull and lifeless art
  - (3) to create lively and shocking titles for his artwork
  - (4) to study other artists and copy their style
  - (5) to make a new kind of art that is available to everyone
8. Which of the following is the best description of the tone of this review?
  - (1) sarcastic
  - (2) uncaring
  - (3) hysterical
  - (4) arrogant
  - (5) respectful
9. How is this excerpt organized?
  - (1) pros and cons of modern art
  - (2) examples of works followed by discussion of artist's philosophy
  - (3) defense of the artist's work followed by criticism of it
  - (4) discussion of the artist's works in chronological order
  - (5) comparison and contrast of the artist's work with others



---

Questions 10 through 12 refer to the following business document.

**SHOULD THE GOVERNMENT MANDATE THAT EMPLOYERS PROVIDE HEALTH COVERAGE TO TEMPORARY WORKERS?**

The National Association of Temporary Services (NATS), which represents the nation's temporary help employers, testified today before the House Ways and Means

(5) Committee on the employer mandate and related provisions of the President's Health Security Act (H.R. 3600).

Edward A. Lenz, NATS senior vice president, legal and government affairs, said that

(10) the temporary help industry supports the principle of universal coverage, but has serious concerns that the cost of mandates could weaken the ability of the temporary help industry to act as a "jobs bridge" to regular, full-time employment.

According to Lenz, the temporary help industry has recently "assumed a new and vital role—by helping to ease the burden on individuals during the current restructuring of the American work force. Temporary work offers displaced workers a critical safety net of income, benefits, and skills training and often provides a bridge back to regular, full-time employment."

(15) In addition, the Association is concerned that the mandates, as currently structured, would "also impose enormous administrative burdens" due to annual temporary employee turnover in the range of 400 to 600 percent. If employer mandates are adopted, Lenz urged Congress to create a mechanism that relates premium payments to hours worked, such as a simple payroll tax.

Excerpt from *Independent Consultant's Brochure and Letter Handbook* by Herman Holtz. Copyright © 1995. Reprinted by permission of John Wiley & Sons, Inc.

10. Which of the following states one of the main concerns of NATS?

- (1) Temporary workers already get health benefits elsewhere, so NATS does not need to provide them.
- (2) NATS won't be able to offer skills training to temporary employees if the government mandates coverage.
- (3) There will be an increase in turnover of temporary employees if the government mandates coverage.
- (4) The cost of mandated coverage will lessen the ability of NATS to hire and supply temporary workers.
- (5) Restructuring the work force is a burden to all Americans.

11. According to the press release, why have businesses supplying temporary help become even more necessary?

- (1) More and more businesses want to hire only temporary help.
- (2) Many workers are losing their jobs and need temporary jobs until they find permanent work again.
- (3) There is not enough work for everyone to have a full-time permanent job.
- (4) The job turnover rate has gone as high as 400 to 600 percent.
- (5) More and more workers do not want permanent full-time work.

12. What is the overall purpose of this piece?

- (1) to raise awareness of one side of an issue
- (2) to stimulate debate over universal health insurance coverage
- (3) to impress both the Congress and the president
- (4) to describe various alternatives to mandated coverage
- (5) to persuade Congress to guarantee health benefits

---

Questions 13 through 16 refer to the following excerpt from a historical feminist speech.

**WHAT CONCERNS THIS SPEAKER?**

- We have met here today to discuss our rights and wrongs, civil and political, and not, as some have supposed, to go into the detail of social life alone. We do not propose to petition the legislature to make our husbands just, generous, and courteous, to seat every man at the head of a cradle, and to clothe every woman in male attire. None of these points, however important they may be considered by leading men, will be touched in this convention. As to their costume, the gentlemen need feel no fear of our imitating that, for we think it in violation of every principle of taste, beauty, and dignity; notwithstanding all the contempt cast upon our loose, flowing garments, we still admire the graceful folds, and consider our costume far more artistic than theirs. Many of the nobler sex seem to agree with us in this opinion, for the bishops, priests, judges, barristers, and lord mayors of the first nation on the globe, and the Pope of Rome, with his cardinals, too, all wear the loose flowing robes, thus tacitly acknowledging that the male attire is neither dignified nor imposing. No, we shall not molest you in your philosophical experiments with stocks, pants, high-heeled boots, and Russian belts. Yours be the glory to discover, by personal experience, how long the kneepan can resist the terrible strapping down which you impose, in how short time the well-developed muscles of the throat can be reduced to mere threads by the constant pressure of the stock, how high the heel of a boot must be to make a short man tall, and how tight the Russian belt may be drawn and yet have wind enough left to sustain life.
- (40) But we are assembled to protest against a form of government existing without the consent of the governed—to declare our right to be free. . . .

From a speech at a woman's-rights convention by Elizabeth Cady Stanton, as reprinted in *A Treasury of the World's Great Speeches*, edited by Houston Peterson, New York: Simon & Schuster, 1954, 1965.

13. Which of the following best restates the lines “Yours be the glory to discover . . . how long the kneepad can resist the terrible strapping down which you impose” (lines 29–32)?
- (1) Men do not understand how uncomfortable women’s clothes are.
  - (2) Women will not resort to wearing pants or other restrictive men’s clothing.
  - (3) Men will only understand women when women dress like them.
  - (4) Men and women will be equal only when they both wear belts and collars.
  - (5) Men and women should not be concerned with how they dress.
14. What is a “stock” (lines 28 and 35)?
- (1) a man’s jacket
  - (2) a wooden frame holding a prisoner
  - (3) a tight belt
  - (4) a loose shirt
  - (5) a cloth worn around the neck
15. If the speaker attended a fancy tea party, which of the following would she be most likely to do?
- (1) be on her best behavior
  - (2) speak up about current events
  - (3) treat the hostess like royalty
  - (4) gossip about men
  - (5) comment on everyone’s clothing
16. Later in the speech, Stanton states that “over the horns of bigotry and prejudice will be our way.” Based on this and the excerpt, you can conclude that Stanton is giving this speech for what reason?
- (1) Women are fighting for the right to vote.
  - (2) Women are tired of being made to wear dresses.
  - (3) Husbands need to be made just and generous.
  - (4) All types of prejudice must be fought.
  - (5) Many people mistakenly judge others by their appearance.

**Answers and explanations start on page 658.**



## RATIO, PROPORTION, AND PERCENT

## Using Ratio and Proportion to Solve Problems

**Key Ideas**

- A ratio has two terms and can be written in words, with a colon, or as a fraction.
- Ratios are simplified by reducing to lowest terms.
- The terms in a ratio can have different labels.

**GED TIP**

*The terms in a ratio must be written in the order given by the words of the question. Don't be fooled by an answer choice that reverses the order of the numbers.*

**Ratio**

A **ratio** compares two numbers. You can write a ratio using the word *to*, using a colon (:), or using fraction form.

**Example 1:** A softball pitcher strikes out four batters for every one batter that she walks. What is the ratio of strikeouts to walks?

Always write the numbers in the ratio in the same order in which they appear in the question. **4 to 1** **4:1**  $\frac{4}{1}$

Ratios are similar to fractions. They have two terms, and they can be simplified by reducing to lowest terms.

**Example 2:** Frank manages a small drugstore. During a two-hour period, he counts 25 cash sales and 15 credit card sales. What is the ratio of credit card to cash sales?

1. Write the ratio as a fraction with the terms in the correct order: credit card to cash sales.  $\frac{\text{credit card sales}}{\text{cash sales}} = \frac{15}{25}$

2. Reduce to lowest terms. The ratio of credit card to cash sales is **3 to 5**.  $\frac{15 \div 5}{25 \div 5} = \frac{3}{5}$

There are some fraction rules that ratios do not follow. Do not change a ratio that is an improper fraction to a mixed number. Also, if a ratio in fraction form has a denominator of 1, **do not** write it as a whole number. Leave it in fraction form.

Another important difference is in the use of labels. The terms in a fraction have the same unit labels:  $\frac{5}{6}$  of a pie means 5 slices out of 6 slices. Ratios may have different labels: The sale advertised 6 cans for \$1, a 6:1 ratio.

To write a ratio, you may need to perform one or more basic operations to find one of the terms.

**Example 3:** A football team won 12 games and lost 8. What is the ratio of games won to games played?

1. The problem does not tell you the number of games played. Add the games won to the games lost to find the games played.  $12 \text{ won} + 8 \text{ lost} = 20 \text{ played}$

2. Write the ratio in the correct order and simplify. **The team won 3 games for every 5 games it played, a 3:5 ratio.**  $\frac{\text{games won}}{\text{games played}} = \frac{12}{20} = \frac{12 \div 4}{20 \div 4} = \frac{3}{5}$

---

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 1.1

### A. Write each ratio as a fraction in lowest terms.

1. Stan made 24 sales in 6 hours. What is the ratio of sales to hours?
2. Carol's monthly take-home pay is \$1500. She spends \$250 a month on food. What is the ratio of food costs to take-home dollars?
3. A toy rocket travels 180 ft in 15 sec. What is the ratio of feet to seconds?
4. At Phil's work, there are 12 part-time workers and 18 full-time workers. What is the ratio of part-time workers to total workers?
5. Juanita drove 336 miles on 14 gallons of gasoline. What is the ratio of miles to gallons?
6. Lynn estimates that a roofing job will cost \$1500. Bo estimates that the same job will cost \$2400. What is the ratio of Lynn's estimate to Bo's estimate?
7. A basketball player attempted 32 free throws and made 20. What is the ratio of free throws made to free throws missed?
8. There are 10 men and 14 women in Kathleen's math class. What is the ratio of women to the total number of students in the class?
9. To paint his apartment, Alex bought 6 gallons of paint to cover 1440 square feet. What is the ratio of square feet to gallons of paint?

### B. Choose the one best answer to each question.

Questions 10 through 12 refer to the following information.

Three candidates are running for mayor. Below are the results of a survey of 600 registered voters.

Candidate	Number of Supporters
Stothard	220
Mesa	180
Newmark	50
Undecided	150

10. What is the ratio of Mesa's supporters to Stothard's supporters?
  - (1) 2:11
  - (2) 9:11
  - (3) 11:9
  - (4) 11:20
  - (5) 20:11
11. What is the ratio of voters who prefer Mesa to the total number surveyed?
  - (1) 2 to 5
  - (2) 3 to 7
  - (3) 3 to 10
  - (4) 3 to 13
  - (5) 11 to 30
12. What is the ratio of undecided voters to voters who have made a decision?
  - (1)  $\frac{1}{4}$
  - (2)  $\frac{1}{3}$
  - (3)  $\frac{3}{1}$
  - (4)  $\frac{4}{1}$
  - (5) Not enough information is given.
13. Soan made a \$400 down payment on a washer and dryer that cost a total of \$1200. What is the ratio of the amount paid to the amount owed?
  - (1) 1 to 4
  - (2) 1 to 3
  - (3) 1 to 2
  - (4) 2 to 3
  - (5) 3 to 4
14. After playing 77 games, a team won 56 games. What is the ratio of wins to losses?
  - (1) 3:8
  - (2) 8:19
  - (3) 8:11
  - (4) 11:8
  - (5) 8:3

Answers and explanations begin on page 668.

## Proportion

A **proportion** is an equation that shows that two ratios are equal. The cross **products** in a true proportion are equal. In other words, when you multiply diagonally across the equals sign, the products are equal.

**Example 1:** The directions on a can of powdered drink mix say to add 3 cups of water to every 2 scoops of drink mix. Matt adds 12 cups of water to 8 scoops of drink mix. Did he make the drink correctly?

1. Write a proportion, making sure the terms of the ratios are in the same order.
2. Cross multiply and compare the products. Since the products are the same, the ratios are equal. **Matt made the drink correctly.**

$$\begin{array}{l} \frac{\text{cups}}{\text{scoops}} \quad \frac{3}{2} \begin{array}{l} \nearrow 12 \\ \searrow 8 \end{array} \\ 3 \times 8 = 24 \\ 2 \times 12 = 24 \end{array}$$

In most proportion problems, you are asked to solve for a missing term.

**Example 2:** A map scale says that 2 inches = 150 miles. What actual distance would a map distance of 5 inches represent?

1. Write a proportion with both ratios in the same form: inches to miles. The variable  $x$  represents the unknown distance.
2. Locate the term in the first ratio that is diagonal from the known term in the second ratio. Cross multiply.
3. Divide the result by the remaining known term to find the value of  $x$ .

$$\begin{array}{l} \frac{\text{inches}}{\text{miles}} \quad \frac{2}{150} = \frac{5}{x} \\ \frac{2}{150} \begin{array}{l} \nearrow 5 \\ \searrow x \end{array} \\ 150 \times 5 = 750 \\ 750 \div 2 = \mathbf{375 \text{ miles}} \end{array}$$

Some proportion problems ask you to find a **rate**. A rate compares a quantity to 1. When a rate is written in fraction form, its denominator is always 1. In word form, rates are often expressed using the word *per*.

**Example 3:** Connie drove 276 miles on 12 gallons of gasoline. How many miles per gallon did she get on the trip?

1. Gas mileage is one kind of rate. You need to find how many miles Connie drove on one gallon of gasoline.
2. Solve.

$$\begin{array}{l} \frac{\text{miles}}{\text{gallons}} \quad \frac{276}{12} = \frac{x}{1} \\ 276 \times 1 = 276 \\ 276 \div 12 = \mathbf{23 \text{ miles per gallon}} \end{array}$$

Using your calculator, you can solve proportion problems in one series of calculations.

**Example 4:** Find the value of  $x$  in the proportion  $\frac{6}{16} = \frac{21}{x}$ .

You need to multiply 16 and 21, then divide by 6.

Press: 16  $\times$  21  $\div$  6 = 56

The missing term is **56**.

**Note:** When working a problem, ask yourself if it can be solved using proportion. This may be possible when two quantities are compared or when three values are given and you are asked to find a fourth.

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 1.2

A. Solve for the missing term in each proportion problem. Use your calculator for questions 9 through 16. *Note:* Answers will not always be whole numbers.

1.  $\frac{2}{3} = \frac{x}{18}$

2.  $\frac{3}{5} = \frac{27}{x}$

3.  $\frac{6}{5} = \frac{3}{x}$

4.  $\frac{15}{2} = \frac{x}{8}$

5.  $\frac{4}{\$2.12} = \frac{7}{x}$

6.  $\frac{25}{6} = \frac{400}{x}$

7.  $\frac{7}{30} = \frac{x}{9}$

8.  $\frac{0.5}{12} = \frac{3}{x}$

9.  $\frac{20}{2.5} = \frac{100}{x}$

10.  $\frac{\$5.96}{2} = \frac{x}{3}$

11.  $\frac{12}{5} = \frac{3}{x}$

12.  $\frac{4}{60} = \frac{2.5}{x}$

13.  $\frac{3}{19} = \frac{x}{114}$

14.  $\frac{9}{\$80.10} = \frac{x}{\$284.80}$

15.  $\frac{\$26.00}{4} = \frac{x}{7}$

16.  $\frac{24}{96} = \frac{7}{x}$

B. Choose the **one best answer** to each question. You **MAY** use your calculator for questions 20 through 22.

17. A store is advertising the following sale:

Tomato Soup 4 cans for \$0.98
----------------------------------

To the nearest cent, how much would five cans of tomato soup cost?

- (1) \$0.25
- (2) \$1.23
- (3) \$2.45
- (4) \$3.92
- (5) \$12.25

18. The Bay City Cardinals have won 5 out of 8 games. At the same rate, how many games will they have to play to win 60 games?

- (1) 190
- (2) 180
- (3) 120
- (4) 96
- (5) 12

19. Carla drove her truck 414 miles on 18 gallons of gasoline. How many miles did she drive per gallon?

- (1) 18
- (2) 23
- (3) 74
- (4) 95
- (5) Not enough information is given.

20. The scale on a map reads, "2 cm = 150 km." How many kilometers would be represented by a distance of 4.6 centimeters?

- (1) 92
- (2) 300
- (3) 345
- (4) 690
- (5) 1380

21. Two ingredients in a recipe are  $2\frac{1}{2}$  cups of flour and  $1\frac{1}{2}$  cups of sugar. If June keeps the proportion the same, how many cups of flour should she add to 4 cups of sugar?

- (1) 10
- (2)  $6\frac{2}{3}$
- (3) 6
- (4) 5
- (5)  $3\frac{3}{4}$

22. Claudia drove 155 miles in 2.5 hours.

Which of the following expressions could be used to find how many miles she can drive in 7 hours?

- (1)  $155 \times 7 \div 2.5$
- (2)  $2.5 \times 7 \div 155$
- (3)  $155 \times 2.5 \div 7$
- (4)  $2.5 \div 7 \times 155$
- (5)  $7 \times 2.5 \times 155$

**Answers and explanations begin on page 668.**

## RATIO, PROPORTION, AND PERCENT

## Understanding Percents

**Key Ideas**

- The percent symbol (%) means “out of 100.”
- The three elements of a percent problem are the base, the part, and the rate.
- Percent problems can be solved by writing a proportion that has a percent ratio with a denominator of 100.

**GED TIP**

*The word of often comes before the base in a percent problem. For example, if you are asked to find 75% of 250, you know that 250 is the base.*

**Breaking Down Percent Problems**

Percent means “per hundred” or “out of one hundred.” For example, if you have \$100 and you spend \$25, you spent \$25 out of \$100, or 25% of your money.

Since percent is a way of showing part of a whole, it has much in common with fractions and decimals. To convert a percent to a fraction, write the percent over 100 and reduce. To convert percents to decimals, drop the percent symbol and move the decimal point two places to the left.

**Percent to Fraction**

$$25\% = \frac{25}{100} = \frac{1}{4}$$

**Percent to Decimal**

$$25\% = .25 = 0.25$$

In any percent problem, there are three elements: the base, the part, and the rate. The **base** is the whole quantity, or amount, that the problem is about. The **part** (also called a **percentage**) is a portion of the base. The **rate** is a number followed by the percent symbol (%).

**Example 1:** At a restaurant, Janice’s bill is \$20. She gives the waiter a tip of \$3, which is 15% of her bill. Identify the base, part, and rate in this situation.

The entire bill of \$20 is the base. The \$3 tip is part of the base, and the rate is 15%.

One way to think of a percent problem is as a proportion. In Example 1, there are two ratios. The \$3 tip is part of the \$20 total bill, and 15% is the same as  $\frac{15}{100}$ . Since the two ratios are equal, they can be written as a proportion.

$$\frac{\text{part}}{\text{base}} = \frac{3}{20} = \frac{15}{100}$$

$$20 \times 15 = 300$$

Cross multiply to prove the ratios are equal.

$$3 \times 100 = 300$$

You can solve percent problems by setting up a proportion and solving for the missing elements. Just remember to express the percent as a number over 100.

**Example 2:** At a plant that manufactures lighting fixtures, it is expected that about 2% of the fixtures assembled each day will have some type of defect. If 900 fixtures are completed in one day, how many are expected to be defective?

1. Write a proportion. Remember that 2% means 2 out of 100. Use the variable  $x$  to stand for the number of defective fixtures.

$$\frac{\text{part}}{\text{base}} = \frac{\text{rate}}{100}$$

$$\frac{x}{900} = \frac{2}{100}$$

2. Solve for  $x$ . Cross multiply and divide by the remaining number. **The company can expect about 18 defective fixtures.**

$$900 \times 2 = 1800$$

$$1800 \div 100 = 18$$

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 2

A. For each situation, identify and label the base, part, and rate.

- Victor owes his uncle \$1000. Recently, he gave his uncle \$200. The payment was 20% of the money he owes.
- On a test with 80 problems, Sophie got 72 problems right. In other words, she answered 90% of the problems correctly.
- The Kang family made a down payment of \$2,740 on a new car. The down payment was 20% of the purchase price of \$13,700.
- Zoe's take-home pay each month is \$2000. She spends \$500 on rent each month, which is 25% of her take-home pay.
- This year, Rafael has 60 regular customers, which is 150% of the 40 regular customers he had last year.
- Kayla bought a dress for \$38. She paid \$3.23 in sales tax. The sales tax rate in her state is 8.5%.
- Misako's employer withholds 15% of her salary each paycheck for taxes. Misako earns \$900 each week, and her tax withholding is \$135.
- Harrison got a 10% raise. Before the raise, his hourly wage was \$10.70. Now he earns an additional \$1.07 per hour.
- Kim Industries has 800 employees. Of those, 200 workers, or 25%, work part-time.
- In an election, 5,000 of the 12,500 registered voters actually voted. Only 40% of the registered voters actually voted.

B. Choose the one best answer to each question. Use the proportion  $\frac{\text{part}}{\text{base}} = \frac{\text{rate}}{100}$  to solve each problem.

Questions 11 and 12 refer to the following information.

A local newspaper printed the following high school basketball standings:

Team	Wins	Losses
Fairfax	9	3
Hamilton	8	4
Bravo	6	6
Mountain View	4	8
Lincoln	3	9

11. Which of the following expressions could be used to find what percent of its total games Fairfax has won?

- $\frac{9 \times 100}{12}$
- $\frac{3 \times 100}{12}$
- $\frac{12 \times 100}{9}$
- $\frac{12 \times 100}{3}$
- $\frac{6 \times 100}{12}$

12. What percent of its games did Bravo win?

- 100%
- 75%
- 60%
- 50%
- 25%

13. A jacket with a price tag of \$128 is on a rack with the following sign:

All Items:  
25% off marked price  
Discount taken at register

By how much will the price be reduced when the jacket is taken to the register?

- \$4
- \$25
- \$32
- \$96
- Not enough information is given.

Answers and explanations begin on page 668.

## RATIO, PROPORTION, AND PERCENT

## Using the Percent Formula

Key Ideas

- You can use a formula to solve percent problems:  $Base \times Rate = Part$ .
- To change a percent to a decimal, drop the % sign and move the decimal point two places to the left.
- To change a decimal to a percent, move the decimal point two places to the right and add the % sign.

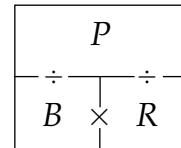
**GED TIP**

When you take the GED Math Test, make a quick sketch of the percent diagram on scratch paper to help you analyze percent problems.

**Solving for Part**

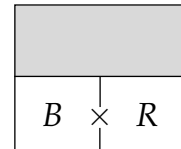
You have seen how to use proportion to solve percent problems. You can also solve percent problems using the formula  $Base \times Rate = Part$ .

Study the diagram at the right to learn how to use the formula. To use the diagram, cover the element you need to solve for:  $B = Base$ ,  $R = Rate$  (percent), and  $P = Part$ . Then perform the operation that connects the remaining elements.



**Example 1:** A company offers its employees two health plans. In a recent newsletter, the personnel department stated that 70% of the employees chose Plan A. If the company has 320 workers, how many chose Plan A?

1. The rate is 70%, and the base is 320, the total number of workers. You need to solve for the part. Using the diagram, cover  $P$  for part. You can see that you need to multiply to solve the problem.



2. Change the percent to a decimal and multiply.  
**Out of 320 workers, 224 chose Plan A.**

$$70\% = 0.7$$

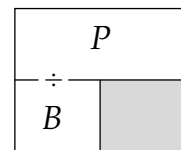
$$320 \times 0.7 = 224$$

**Solving for Rate**

Rewrite the percent formula to solve for rate. Use the formula  $Part \div Base = Rate$ . You can use the diagram to help you remember the formula.

**Example 2:** A computer system is regularly priced at \$1600. On Friday the manager reduced the price by \$640. By what percent did the manager discount the computer system?

1. The base is \$1600, the regular price. The part is \$640, the amount the price was reduced. You are asked to find the rate of the discount. Cover  $R$  for rate (percent). You need to divide the part by the base to solve the problem.
2. Divide 640 by 1600.
3. Convert the decimal answer to a percent by moving the decimal point two places to the right and adding the percent sign. The price reduction was a **40% discount**.



$$\begin{array}{r} .4 \\ 1600 \overline{)640.0} \\ \underline{640 \ 0} \\ 0.4 = 40\% \end{array}$$

Always ask yourself whether your answer seems reasonable. For example, you know that 40% is a little less than  $\frac{1}{2}$ , and  $\frac{1}{2}$  of \$1600 is \$800. Since \$640 is a little less than \$800, it is a reasonable answer.



## RATIO, PROPORTION, AND PERCENT ► PRACTICE 3.1

A. Solve. You **MAY** use a calculator for questions 7 through 17.

1. What is 20% of \$25?
2. Find 90% of 200.
3. What is 35% of 400?
4. What percent is 19 out of 20?
5. 42 is what percent of 168?
6. What percent is \$18 out of \$600?
7. Find  $33\frac{1}{3}\%$  of 51. (*Hint:  $33\frac{1}{3}\% = \frac{1}{3}$* )
8. What is 125% of \$48?
9. 240 is what percent of 120?
10. What percent is 3 out of 60?
11. \$52 is what percent of \$650?
12. Find  $8\frac{1}{2}\%$  of \$46.
13. \$0.65 is what percent of \$10.00?
14. Find 28% of \$1300.
15. What percent is 2.5 out of 4?
16. Find  $66\frac{2}{3}\%$  of 108. (*Hint:  $66\frac{2}{3}\% = \frac{2}{3}$* )

B. Choose the **one best answer** to each question. You **MAY** use your calculator.

17. Pat called 120 customers to offer a software upgrade. Of those he called, 72 purchased the upgrade. What percent agreed to the purchase?

- (1) 6%
- (2) 40%
- (3) 48%
- (4) 60%
- (5)  $66\frac{2}{3}\%$

18. Douglas received a 6% raise. If his old monthly salary was \$2,250, what is his monthly salary now? (*Hint: Find the amount of the raise. Then add the raise to the previous monthly salary.*)

- (1) \$1,125
- (2) \$2,256
- (3) \$2,385
- (4) \$3,600
- (5) \$13,500

19. At a restaurant Levy's total bill is about \$46. Which of the following expressions could he use to calculate a 15% tip?

- (1)  $\$46 \times 15$
- (2)  $\$46 \div 15 \times 100$
- (3)  $\$46 \times 15 \times 100$
- (4)  $\$46 \div 0.15$
- (5)  $\$46 \times 0.15$

20. The following advertisement for sporting goods appeared in the newspaper. What percent of the original price is the sale price?

Little League Package Magnum bat, tote bag, and youth cleats Only \$45.50 Originally \$65 You SAVE \$20!
--

- (1) 20%
- (2) 31%
- (3) 44%
- (4) 70%
- (5) Not enough information is given.

21. Lydia pays \$3 sales tax on a \$50 purchase. Which of the following expressions could be used to find the sales tax rate in her state?

- (1)  $\frac{\$3 \times 100}{\$50}$
- (2)  $\frac{\$3 \times \$50}{100}$
- (3)  $\$3 \times \$50 \times 100$
- (4)  $\$3 \div \$50$
- (5)  $\$3 \times \$50$

Answers and explanations begin on page 668.

## Solving for Base

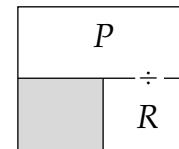
Some problems on the GED Math Test may require you to solve for the base in a percent situation. Remember, the base represents the whole item or group. Read each situation carefully to figure out which element is missing. Then choose the correct method for solving the problem.

**Example 3:** In a math class, 75% of the students got at least a B grade on the final exam. If 18 students got at least a B, how many students are in the class?

1. Analyze the situation. The 18 students are part of the larger class. You know that the 18 students are 75% of the whole group, so 75% is the rate and the base is unknown.

Use the diagram. Cover *B* for base. You need to divide the part by the rate to solve the problem.

2. Convert the rate to a decimal (75% = 0.75) and divide. There are **24 students** in the class.

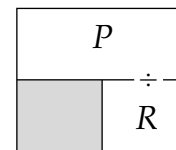


$$\begin{array}{r} 24 \\ 0.75 \overline{)18.00} \\ \underline{150} \phantom{0} \\ 300 \\ \underline{300} \\ 0 \end{array}$$

Most of the time we work with percents that are less than 100%. When a percent is less than 100%, the part is less than the base. However, it is possible to have a situation in which the part is greater than the base. When this occurs, the percent will be greater than 100%.

**Example 4:** The workforce at Eastland Inc. is growing rapidly. The number of employees this year is 225% of the number last year. If there are 135 employees this year, how many employees did the company have last year?

1. The base is the number of employees the company had last year. This year's number is a percent of last year's number. Therefore, the rate is 225%, the part is 135, and the base is unknown.



2. Convert 225% to a decimal. Drop the % sign and move the decimal point two places to the left.
3. Divide the part (135) by the rate (2.25). Last year there were only **60 employees**.

$$225\% = 2.25 = 2.25$$

$$\begin{array}{r} 60 \\ 2.25 \overline{)135.00} \\ \underline{1350} \\ 0 \end{array}$$

Some problems on the GED Math Test are set-up problems. Instead of finding a solution, you have to choose the correct method for solving the problem. (See problems 19 and 21 on page 397.) These choices may be based on the percent formula shown in this lesson or on the proportion method shown in Lesson 2.

Both of these set-up choices show a correct method for solving Example 4.

$$\text{Formula method: } \frac{135}{2.25} \qquad \text{Proportion method: } \frac{135 \times 100}{225}$$

If you evaluate both methods using a calculator, both expressions equal 60, the correct solution.

**Note:** Don't begin calculations before you completely analyze a situation. Every percent problem has three elements. Make sure you know which one is missing before you multiply or divide.

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 3.2

### A. Find the missing element in each set.

- \$35 is 20% of what amount?
- 5% of what number is 14?
- 3.2 is 50% of what number?
- \$170 is 85% of what amount?
- 24 is 80% of what number?
- \$105 is 125% of what amount?
- 190 is 95% of what number?
- What number is 15% of 60?
- 90% of \$15 is what number?
- \$42 is what percent of \$168?
- \$150 is 200% of what amount?
- 15% of \$62 is what amount?
- 9 is 1% of what number?
- What percent is 126 of 140?
- 65% of \$1200 is what amount?
- 5% of an amount is \$156. What is the amount?
- $2\frac{1}{2}\%$  of a number is 100. What is the number?
- What percent is \$15.60 of \$156.00?

### B. Choose the one best answer to each question. You MAY use your calculator.

19. Kevin's total payroll deductions are 30% of his earnings. If his deductions add up to \$369 for a two-week period, how much were his earnings for the period?

- \$110.70
- \$123.00
- \$1,230.00
- \$11,070.00
- Not enough information is given.

20. City council established the following budget to improve public transportation.

	Project Budget
Salaries	50%
Office lease	35%
Equipment	6%
Supplies	2%
Miscellaneous	7%

If \$72,000 is allotted for equipment, what is the total budget for the project?

- \$94,000
- \$432,000
- \$940,000
- \$1,200,000
- \$120,000,000

21. Jack earns a 5% commission on each sale. If he is paid a \$160 commission, which of the following expressions could be used to find the amount of the sale?

- $\frac{5 \times 100}{160}$
- $\frac{160 \times 100}{5}$
- $\frac{5 \times 160}{100}$
- $5 \times 100 \times 160$
- $5 \div 160 \times 100$

22. American Loan Company mailed 3600 customers an application for a new credit card. Only 20% of the customers returned the application. Which of the following expressions could be used to find how many customers returned the application?

- $3600 \times 2 \times 100$
- $\frac{12}{5} = \frac{3}{x}$
- $\frac{3600 \times 100}{0.2}$
- $3600 \times 0.2$
- $3600 \div 0.2$

**Answers and explanations begin on page 669.**

## RATIO, PROPORTION, AND PERCENT

Solving Problems  
Using a Calculator**Key Ideas**

- To use the % key to solve problems, multiply or divide as you would normally, pressing the percent key last. The display will show the answer.
- Do not change the percent to a decimal or a fraction if you are using the percent key.

**GED TIP**

You may find it easier to solve a problem with a fraction instead of a percent. For example, it is easier to find  $\frac{1}{3}$  of some numbers than to find  $33\frac{1}{3}\%$  of a number.

**Using the Percent Key**

You already know how to solve problems with fractions and decimals on a calculator. By changing a percent to either a fraction or decimal, you can use a calculator to solve a percent problem.

**Example 1:** What is 25% of 120?

Change 25% to a decimal and multiply.  $25\% = 0.25$

Press: 120  $\times$  .25  $=$

Change 25% to a fraction and multiply.  $25\% = \frac{25}{100} = \frac{1}{4}$

Press: 120  $\times$  1  $\frac{a^b/c}{c}$  4  $=$

Using either method, you find that **30 is 25% of 120.**

You can also use the percent key  $\%$  on your calculator. On the *Casio fx-260* (the calculator provided with the GED), the percent key is the second function above the equals key  $=$ . To access a second function, you must first press the shift key located in the upper left corner of the calculator and then press the function key.

When you use the percent key, there is no need to convert the percent to either a fraction or decimal. Study the examples below to learn how to use this key. Notice that you must press the % key last in each example.

**Example 2:** What is 65% of \$360?

Multiply the base (\$360) and the rate (65%) to find the part.

Press: 360  $\times$  65  $\text{SHIFT}$   $\%$  The display reads

The amount **\$234** is 65% of \$360.

**Example 3:** Ned paid \$150 for a sound system. The amount was 20% of the total cost of the system. What was the total cost of the system?

Divide the part (\$150) by the rate (20%) to find the base.

Press: 150  $\div$  20  $\text{SHIFT}$   $\%$  The display reads

The cost of the system was **\$750.**

**Example 4:** Mona spends \$400 of her monthly earnings on child care. If she earns \$2500 per month, what percent does she spend on child care?

Divide the part (\$400) by the base (\$2500) to find the rate.

Press: 400  $\div$  2500  $\text{SHIFT}$   $\%$  The display reads

Mona spends **16%** of her salary on child care.

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 4

### A. Solve these problems using a calculator.

- Find 46% of \$130.
- 14% of what amount is \$13.44?
- What is 12% of \$126?
- What number is  $62\frac{1}{2}\%$  of 64?
- 12 is what percent of 400?
- A number is 32% of 6500. What is the number?
- 36 is what percent of 144?
- 90% of what number is 63?
- Find 7% of 360.
- What number is  $33\frac{1}{3}\%$  of 237?
- 25 is what percent of 1000?
- What is  $12\frac{1}{2}\%$  of 384?
- 390 is what percent of 500?
- Find 2% of \$800.
- 32% of what number is 80?
- What number is  $87\frac{1}{2}\%$  of 16?
- \$112 is what percent of \$1600?
- A number is  $66\frac{2}{3}\%$  of 414. What is the number?

### B. Choose the one best answer to each question. You MAY use your calculator.

Questions 19 and 20 refer to the following chart.

Shipping and Handling Information	
For items costing:	% of order + handling:
\$20 or less	3% + \$1.50
\$20.01 to \$50	4% + \$2.50
\$50.01 to \$100	5% + \$4.00
\$100.01 or more	8%

19. Chanel placed an \$84 order. How much shipping and handling will she be charged on her order?

- \$4.20
- \$4.40
- \$7.56
- \$8.20
- \$8.36

20. Jason placed an order totaling \$110. Zola placed a \$90 order. How much more did Jason pay in shipping and handling than Zola?

- \$0.30
- \$4.30
- \$4.50
- \$4.60
- \$20.00

21. In an election, 3190 out of 3625 registered voters voted against a tax increase. What percent of the registered voters voted against the increase?

- 43%
- 83%
- 88%
- 98%
- 113%

22. A baseball player has the following statistics. To the nearest percent, what percent of the player's at bats were strikeouts?

At Bats	Hits	Home Runs	Walks	Strikeouts
410	108	2	70	63

- 90%
- 85%
- 58%
- 26%
- 15%

Answers and explanations begin on page 669.

## RATIO, PROPORTION, AND PERCENT

## Simple Interest

**Key Ideas**

- Simple interest is found by multiplying principal, rate, and time:  $i = prt$ .
- The time must be written in terms of years. Write months as a fraction of a year.
- To find the amount paid back, add the principal and the interest.

**GED TIP**

A formulas page (see page 688) is provided when you take the GED Math Test. Try to memorize some of the formulas as you work through this book so you can save time on the test.

**Solving Simple Interest Problems**

**Interest** is a fee paid for the use of someone else's money. If you put money in a savings account, you receive interest from the bank. If you borrow money, you pay interest. In each case, the amount that you invest or borrow is called the **principal**.

**Simple interest** is a percent of the principal multiplied by the length of the loan. The formula for finding simple interest is given on the formulas page of the GED Math Test (see page 688). It reads:

$$\text{simple interest} \quad \text{interest} = \text{principal} \times \text{rate} \times \text{time}$$

You may find it easier to remember the formula using **variables** (letters that stand for numbers):  $i = prt$ , where  $i$  = interest,  $p$  = principal,  $r$  = rate, and  $t$  = time. Writing variables next to each other means that they are to be multiplied.

**Example 1:** Asher borrows \$2500 from his uncle for three years at 6% simple interest. How much interest will he pay on the loan?

1. Write the rate as a decimal.  $6\% = 0.06$
2. Substitute the known values in the formula. Multiply.  $i = prt$   
 $= \$2500 \times 0.06 \times 3$   
 $= \$450$

Asher will pay **\$450** in interest.

Some problems ask you to find the **amount paid back**. This adds an additional step to an interest problem. In Example 1, Asher will owe \$450 in interest at the end of three years. However, he will pay back the interest (\$450) plus the principal (\$2500):  $\$2500 + \$450 = \$2950$ . When he has finished paying the loan, Asher will have paid his uncle \$2950.

In a simple interest problem, the rate is an annual, or yearly, rate. Therefore, the time must also be expressed in years.

**Example 2:** Eva invests \$3000 for 9 months. She will be paid 8% simple interest on her investment. How much interest will she earn?

1. Write the rate as a decimal.  $8\% = 0.08$
2. Express the time as a fraction of a year by writing the length of time in months over 12, the number of months in a year.  $9 \text{ months} = \frac{9}{12} = \frac{3}{4} \text{ year}$
3. Multiply.  $i = prt$   
 $= \$3000 \times 0.08 \times \frac{3}{4}$

Eva will earn **\$180** in interest.

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 5

A. Solve these problems using the formula for simple interest. You **MAY** use your calculator.

1. Leah borrows \$1500 for 2 years at a 12% interest rate. Find the interest on the loan.
2. How much interest would you pay on a loan of \$800 for 6 months at 14% interest?
3. Dominica invested \$2000 for 3 years at an interest rate of 7%. How much interest did she earn on her money?
4. How much interest would you earn on an investment of \$600 for 8 years at 10% interest?
5. Todd invests \$6500 for  $3\frac{1}{2}$  years at 5% interest. How much interest will he be paid at the end of the time period?
6. Ricardo borrows \$1850 for 8 months at 12% interest. What is the amount he will pay back at the end of the loan period?
7. Yanira puts \$5000 in an investment account for 4 years. If she is paid  $8\frac{1}{2}\%$  simple interest, how much interest will she earn?

B. Choose the **one best answer** to each question. You **MAY** use your calculator.

8. Jean borrowed \$1300 to buy tools for her job as an auto mechanic. The loan is for 1 year 6 months at 9% simple interest. Which of the following expressions could be used to find the amount she will pay back at the end of the loan period?

- (1)  $\$1300 \times 1.5 \times 0.09$
- (2)  $\$1300 \times 1.6 \times 0.09$
- (3)  $\$1300 \times 1.5 \times 9$
- (4)  $\$1300 + (\$1300 \times 9 \times 1.5)$
- (5)  $\$1300 + (\$1300 \times 0.09 \times 1.5)$

9. Noah borrows \$8000 for 5 years to make improvements to his home office. If the simple interest rate is 13%, how much will he pay in interest?

- (1) \$5200
- (2) \$4000
- (3) \$1040
- (4) \$420
- (5) \$400

10. Caleb borrowed \$1500 from his aunt. He plans to pay his aunt back in 9 months. If he pays 4% interest on the loan, what is the total amount he will pay back in 9 months?

- (1) \$540
- (2) \$1455
- (3) \$1545
- (4) \$1560
- (5) \$2040

Questions 11 and 12 refer to the following information.

Option	Length of Loan	Simple Interest Rate
A	$2\frac{1}{2}$ years	12%
B	3 years	10%
C	4 years	9%

11. Charlotte needs to borrow \$2400. She is considering the three loan options shown above. How much more interest would Charlotte pay if she takes loan option C instead of option A?

- (1) \$72
- (2) \$108
- (3) \$144
- (4) \$720
- (5) \$864

12. Charlotte chooses Option B, but she decides to borrow \$2800. What is the total amount she will pay back when the loan is due?

- (1) \$2830
- (2) \$2884
- (3) \$3240
- (4) \$3556
- (5) \$3640

Answers and explanations begin on page 669.



## RATIO, PROPORTION, AND PERCENT

## Percent of Change

**Key Ideas**

- The amount of change is the difference between the new number and the original number.
- Find the percent of change by dividing the amount of change by the original number.
- Percent of increase may be greater than 100%.

**GED TIP**

*You can work backward to check your answers. For example, if a price has decreased by 25%, the new price should be 75% of the original price, since  $25\% + 75\% = 100\%$ .*

**Finding Percent of Increase or Decrease**

Percent is often used to show change.

**Example 1:** Michelle recently started her own business. Last month she earned \$1000. This month she earned \$2000. How could she describe the increase in her earnings?

All of the following statements accurately describe the change.

- Michelle's earnings doubled from last month to this month.
- This month her earnings increased by 100%.
- This month's earnings are 200% of last month's earnings.

**Percent of change** compares a new number, which shows an increase or a decrease, to the original number—the number before the change.

**Example 2:** Before her raise, Lisa earned \$10.50 per hour. Now she earns \$11.34 per hour. What percent raise did her boss give her?

1. Subtract to find the amount of change.  $\$11.34 - \$10.50 = \$0.84$
2. Divide the amount of change by \$10.50, Lisa's wage before the change. Convert the decimal to a percent. Lisa's hourly wage **increased by 8%**.  $\frac{\$0.84}{\$10.50} = 0.08 = 8\%$

Think carefully about a situation to decide which number is the original amount.

**Example 3:** A jacket is on sale for \$90. Three days ago, the jacket was on sale for \$120. By what percent was the price of the jacket reduced?

1. Subtract to find the amount of change.  $\$120 - \$90 = \$30$
2. The price of the jacket was \$120 before it was \$90, so \$120 is the original price. Divide the amount of change by \$120. The new price is **25% less** than the price three days ago.  $\frac{\$30}{\$120} = 0.25 = 25\%$

Percent of increase may be greater than 100%.

**Example 4:** Calvin started his business with 10 employees. Now he has 60 employees. By what percent has his workforce increased?

1. Subtract to find the amount of change.  $60 - 10 = 50$
2. Divide by the original number. Convert the number to a percent. Calvin's workforce has **increased by 500%**.  $\frac{50}{10} = 5.0 = 500\%$

---

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 6

A. Solve as directed. If necessary, round your answer to the nearest percent. You **MAY** use your calculator for questions 7 through 12.

- Find the percent of increase from 2000 to 3000.
- Find the percent of decrease from \$2.00 to \$1.25.
- What is the percent of increase from 30 to 90?
- Find the percent of decrease from 20 to 11.
- Find the percent of increase from \$25 to \$30.
- What is the percent of decrease from 500 to 340?
- Find the percent of increase from \$1.89 to \$2.29.
- What is the percent of decrease from 21 to 3?
- Find the percent of increase from 65 to 338.
- What is the percent of decrease from \$1550 to \$1025?

B. Choose the **one best answer** to each question. You **MAY** use your calculator.

11. Justin recently moved from a part-time to a full-time job. Because of the change, his weekly pay increased from \$280 to \$448. To the nearest percent, by what percent did his income increase?

- 17%
- $37\frac{1}{2}\%$
- 60%
- 168%
- 267%

12. David bought a computer game on sale for \$36. The game was originally \$48. What was the percent of decrease in the game's price?

- 12%
- 25%
- $33\frac{1}{3}\%$
- $66\frac{2}{3}\%$
- 75%

13. The Utleys' rent increased from \$600 to \$636 per month. By what percent did the rent increase?

- 3%
- 4%
- 5%
- 6%
- 7%

Questions 14 and 15 refer to the following information.

Marc sells computer equipment. He buys printers at wholesale and sells them at retail price. Customers who join his discount club pay the member's price.

**Printer Pricing Chart**

Model Number	Wholesale Price	Retail Price	Member's Price
L310	\$63.00	\$141.75	\$92.15
L1430	\$86.00	\$150.50	\$105.35

14. What is the percent of increase from wholesale to retail price of the L310 model?

- 44%
- 56%
- 78%
- 125%
- 225%

15. For the L1430 model, what is the percent of decrease from retail price to member's price?

- 26%
- 30%
- 43%
- 45%
- 53%

Answers and explanations begin on page 669.

## RATIO, PROPORTION, AND PERCENT

## Problem Solving

**Key Ideas**

- After thinking about the question asked in the problem, look for the facts you need.
- Ignore information that has nothing to do with answering the question.
- If a question cannot be answered with facts given in the problem, choose option (5) Not enough information is given.

**GED TIP**

*If you can't solve a problem, try to eliminate options by using common sense. Then make a reasonable guess. This is better than leaving a blank on the answer sheet; a blank will count against you.*

**Too Much or Not Enough Information**

Many GED math problems contain more information than you need to solve a problem. For example, a table or diagram may show numbers that relate to the subject of the problem but have nothing to do with answering the question.

Knowing what information you need to answer a question is an important problem-solving skill. To solve any problem, follow these steps:

- Read the problem carefully. Think about the question asked in the problem.
- Decide what facts and operations you will need to answer the question.
- Find the facts you need.
- Work the problem carefully.
- Think about whether your answer makes sense and seems reasonable.

A few problems on the GED Math Test (probably 2 or 3) will not provide all the information needed to solve them. If it isn't possible to answer the question, choose the option "Not enough information is given." This answer choice will also appear in problems that do contain enough information, so you must only choose it when you are sure it is impossible to answer the question.

**Example:** A department store determines that 80% of the customers on its mailing list live more than 40 miles from the store. Of those, 30% visit the store less than 10 times per year. How many customers on the mailing list live more than 40 miles from the store?

- (1) 32
- (2) 300
- (3) 2000
- (4) 3200
- (5) Not enough information is given.

The correct answer is (5) **Not enough information is given**. The question asks for the number of customers who live more than 40 miles from the store. You know the percent of customers referred to, but you don't know the number of customers on the mailing list. The other numbers in the problem have nothing to do with the question. You don't have enough information to solve the problem.

Problems like the one above can be tricky. For example, if you find 80% of 40 in the example above, you will get the number 32, which is one of the answer options. However, there isn't any reason to find 80% of 40. Eighty percent refers to customers and the number 40 refers to miles. Always avoid calculations that don't make sense. Notice that incorrect answer choices on the GED are often based on common errors in logic.

## RATIO, PROPORTION, AND PERCENT ► PRACTICE 7

Choose the one best answer to each question. You MAY use your calculator for questions 3 through 6.

Questions 1 through 3 refer to the following information.

A state has 286 species of wildlife that have been identified by the federal government as either threatened or endangered. The following table lists several dangers to these species and the number of species affected by each danger.

Danger	Species Affected
Outdoor recreation	123
Road construction	95
Pollution of air, water, and soil	44
Logging	24
Mining	64
Disease	15

- To the nearest whole percent, what percent of the identified species are affected by road construction?
  - 3%
  - 26%
  - 33%
  - 35%
  - Not enough information is given.
- What is the ratio of the number of species affected by logging to the number affected by disease?
  - $\frac{3}{22}$
  - $\frac{5}{8}$
  - $\frac{5}{13}$
  - $\frac{8}{5}$
  - Not enough information is given.
- To the nearest tenth percent, what percent of the identified species are threatened by water pollution?
  - 4.4%
  - 5.1%
  - 12.1%
  - 15.4%
  - Not enough information is given.

Questions 4 and 5 refer to the following information.

Corey's Hardware has the following discounts:

- All utility ladders: 30% off marked price
- Drop cloths: \$2.49 per package
- All paintbrushes: 15% off marked price
- All interior paint: 10% off marked price

- What is the total discount for a utility ladder with a price tag of \$32.50 and two gallons of interior paint, regularly priced at \$19 each?
  - \$7.05
  - \$11.65
  - \$13.55
  - \$21.15
  - Not enough information is given.
- What is the ratio of the price of a can of interior paint to the price of a paintbrush?
  - 2 to 3
  - 3 to 2
  - 10 to 19
  - 19 to 10
  - Not enough information is given.
- Using the Internet, Roy finds the driving distance from his home to several landmarks.

Landmark	Distance in Miles
Baseball Hall of Fame	182
Niagara Falls	95
Finger Lakes	31

Which of the following best represents the ratio of the distance to Niagara Falls to the distance to Finger Lakes?

- 10:1
- 9:1
- 6:1
- 3:1
- Not enough information is given.

Answers and explanations begin on page 670.

### Key Ideas

- Poets sometimes arrange rhymes—the same ending sounds in words—in a specific pattern.
- A poem’s rhythm is the beat of the poem. It can underscore the poem’s meaning and mood.

### GED TIP

You cannot read a poem on the GED Test aloud, but be sure to sound out the words in your head, as if you are reading it aloud. That way, you can hear the rhyme and rhythm.

## POETRY

# Understanding Rhyme and Rhythm

Rhyme and rhythm are the parts of the poem you *hear*. **Rhyme** repeats the sounds at the ends of words. Poets sometimes rhyme the last words in their lines of poetry. For example, in lines 3 and 4 in the poem below, the rhyming words are *leap* and *sleep*. Poets use patterns of rhyme. They might rhyme the first and third line of each stanza, or group of lines. Rhymed poetry is generally pleasing to hear.

**Rhythm** is like the beat of a drum. In poetry, rhythm is created by the stresses you hear as you read the words aloud. Some words or parts of words are stressed, while others are not. Poets use rhythm as one way to emphasize the poem’s meaning. Rhythm can also help create a feeling, or mood. For example, a constant, fast rhythm may be used if the poem is about someone hurrying or running away. You may feel tense as you read the poem.

As you read this poem, hear its rhyme and rhythm.

### Meeting at Night

The grey sea and the long black land;  
And the yellow half-moon large and low;  
And the startled little waves that leap  
In fiery ringlets from their sleep,  
As I gain the cove with pushing prow,  
And quench its speed i’ the slushy sand.

Then a mile of warm sea-scented beach;  
Three fields to cross till a farm appears;  
A tap at the pane, the quick sharp scratch  
And blue spurt of a lighted match,  
And a voice less loud, thro’ its joys and fears,  
Than the two hearts beating each to each!

By Robert Browning.

- ▶ What is the rhyming pattern of the second stanza?
  - (1) first and sixth, second and fifth, third and fourth lines
  - (2) first and second, third and fourth, fifth and sixth lines

You are correct if you chose **(1)**: *beach/each, appears/fears, and scratch/match* rhyme. Because of the pattern, the rhyme in this poem is subtle.

- ▶ Which of the following describes the rhythm of the first stanza?
  - (1) lively—to create excitement about the meeting
  - (2) steady—to convey that the boat is moving at an even pace

You are correct if you chose **(2)**. Try reading the poem out loud and notice how the rhythm is like a steady approach of the boat moving toward land.

---

## POETRY ► PRACTICE 1

Questions 1 through 5 refer to the following poem.

### WHERE DOES THIS MAN SEE HIS LOVE?

#### Secret Love

- I hid my love when young till I  
Couldn't bear the buzzing of a fly;  
I hid my love to my despite  
Till I could not bear to look at light:  
(5) I dare not gaze upon her face  
But left her memory in each place;  
Where'er I saw a wild flower lie  
I kissed and bade my love good-bye.
- I met her in the greenest dells,  
(10) Where dewdrops pearl the wood bluebells;  
The lost breeze kissed her bright blue eye,  
The bee kissed and went singing by,  
A sunbeam found a passage there,  
A gold chain round her neck so fair;  
(15) As secret as the wild bee's song  
She lay there all the summer long.
- I hid my love in field and town  
Till e'en the breeze would knock me down;  
(20) The bees seemed singing ballads o'er,  
The fly's bass turned a lion's roar;  
And even silence found a tongue,  
To haunt me all the summer long;  
The riddle nature could not prove  
Was nothing else but secret love.

By John Clare.

1. Which of the following is the best restatement of "I hid my love to my despite / Till I could not bear to look at light: / I dare not gaze upon her face" (lines 3–5)?
  - (1) Even though her smile lights up her face, I would not tell her I loved her.
  - (2) Even though it was painful, I told her I loved her.
  - (3) Even though I was shy, I looked her in the eye anyway.
  - (4) Because I told her my feelings, I felt ashamed to face her.
  - (5) Because I kept my feelings secret, it would be painful to look her straight in the eye.
2. Why does the speaker keep repeating, "I hid my love"?

It shows that

  - (1) he had no other choice
  - (2) he wants the woman to hear him
  - (3) his life is monotonous
  - (4) he deeply feels his failure to speak
  - (5) the woman is uninterested in him
3. If the speaker attended a large party, which of the following would he most likely do?
  - (1) profess romantic feelings to a woman he just met
  - (2) hope a friend introduces him to someone special
  - (3) dance all night with different partners
  - (4) sit and think of a woman he once loved
  - (5) bring a date who is wearing a gold necklace
4. In the last stanza, which of the following helps convey that the speaker's undeclared love did not fit in with the harmony of nature?
  - (1) an uneven and disturbing rhythm
  - (2) a fast-paced, upbeat rhythm
  - (3) a slow, mournful rhythm
  - (4) the lack of any rhyme or rhythm
  - (5) the disruption of the rhyme pattern
5. Which word best describes the speaker's tone?
  - (1) regretful
  - (2) irritated
  - (3) hopeful
  - (4) confident
  - (5) skeptical

Answers and explanations start on page 660.

### Key Ideas

- Poets use figurative language—words that do not have their literal meaning—to compare different things.
- Some comparisons are introduced by *like* or *as*; others are not. Some comparisons give human characteristics to nonhuman things.

### GED TIP

*You are not penalized for wrong answers on the GED Test, so try not to leave any answer blank. If you return to a skipped question and still cannot determine the answer, mark your best guess.*

## POETRY

# Interpreting Figurative Language

**Figurative language** refers to words that are being used to mean something other than their actual, literal meaning. Poets use figurative language to help paint a mental picture in the reader’s mind. Instead of saying, “His voice was soothing and pleasing,” for example, a poet might say, “His voice was like velvet.”

Figurative language often compares two different things. Sometimes the comparison is signaled by the words *like* or *as*, but not always. A poet might also say, “His voice was velvet.” Another favorite technique of poets is to give a human characteristic to something nonhuman, such as, “The wind sighed.”

As you read this poem, look for figurative language and what it might mean.

### The School Children

The children go forward with their little satchels.  
And all morning the mothers have labored  
to gather the late apples, red and gold,  
like words of another language.

And on the other shore  
are those who wait behind great desks  
to receive these offerings.

How orderly they are—the nails  
on which the children hang  
their overcoats of blue or yellow wool.

And the teachers shall instruct them in silence  
and the mothers shall scour the orchards for a way out,  
drawing to themselves the gray limbs of the fruit trees  
bearing so little ammunition.

From THE HOUSE ON MARSHLAND from THE FIRST FOUR BOOKS by Louise Gluck. Copyright 1968, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1980, 1985, 1995.

- ▶ What is suggested by comparing apples to “words of another language” in the fourth line?
  - (1) a sense of strangeness, not a part of one’s world
  - (2) useless things that have no meaning

You are correct if you chose (1). A language different from your own can seem strange and removed. The mothers feel removed from the world of teachers and schoolchildren.

- ▶ What does the word *shore* in the fifth line refer to?
  - (1) the farthest edge of a lake
  - (2) the world of the classroom

You are correct if you chose (2). The mothers in the poem think of school as far away from them.



## POETRY ► PRACTICE 2

Questions 1 through 5 refer to the following poem.

### WHAT HAPPENS ON THIS FERRY TRIP?

#### Dejeuner sur l'Herbe (Lunch on the Grass)

It's pleasant to board the ferry in the sunscape  
As the late light slants into afternoon;  
The faint wind ruffles the river, rimmed with  
foam.

- (5) We move through the aisles of bamboo  
Towards the cool water-lilies.

The young dandies drop ice into the drinks,  
While the girls slice the succulent lotus root.  
Above us, a patch of cloud spreads, darkening  
Like a water-stain on silk.

- (10) *Write this down quickly, before the rain!*

Don't sit there! The cushions were soaked by  
the shower.

Already the girls have drenched their crimson  
skirts.

Beauties, their powder streaked with mascara,  
lament their ruined faces.

- (15) The wind batters our boat, the mooring-line  
Has rubbed a wound in the willow bark.

The edges of the curtains are embroidered by  
the river foam.

Like a knife in a melon, Autumn slices  
Summer.

*It will be cold, going back.*

Excerpt from "Dejeuner sur L'Herbe" by Tu Fu, translated by Carolyn Kizer, from *Carrying Over: Poems from the Chinese, Urdu, Macedonian, Yiddish, and French African*. Copyright © 1998 by Carolyn Kizer. Reprinted with the permission of Copper Canyon Press, P.O. Box 271, Port Townsend, WA 98368-0271, USA.

1. What is compared to "a water-stain on silk" (line 9)?

- (1) foam on the edge of the river
- (2) rain clouds approaching
- (3) lotus root juice on a tablecloth
- (4) a light rain or drizzle
- (5) ice cubes dropping into cold drinks

2. What is meant by the statement "lament their ruined faces" (line 13)?

- (1) They could no longer smile.
- (2) They were growing old.
- (3) The rain caused their makeup to run.
- (4) The wind was chapping their faces.
- (5) They were unhappy the ferry ride ended.

3. Why is "The edges of the curtains are embroidered by the river foam" (line 16) an effective use of figurative language?

It helps the reader see that

- (1) the people forgot to close the windows and curtains
- (2) the wind is so strong that it is blowing spray from the river into the boat
- (3) the curtains are beautifully edged with lace
- (4) the river is rising quickly
- (5) the people on the boat are in danger

4. According to the speaker, how was the change from summer to autumn (line 17)?

- (1) quick and easy
- (2) halting and uncertain
- (3) sneaky and quiet
- (4) slow and predictable
- (5) pleasant and smooth

5. Which of the following words best describe the tone of this poem?

- (1) scared and threatened
- (2) gentle and calm
- (3) humorous and playful
- (4) wry and observant
- (5) dry and formal

Answers and explanations start on page 661.

### Key Ideas

- A symbol is something that is used to represent something else.
- An image is a mental picture that appeals to one or more of the five senses.

### GED TIP

*Pay attention to the title of the poem on the GED Reading Test. The title often offers important clues about the poem's meaning.*

## POETRY

# Analyzing Symbols and Images

### Symbols

A **symbol** represents something else—usually a concept or idea that is universal, such as love or betrayal. For example, a blossoming cherry tree may symbolize life. It has some of the qualities that life has. However, you must read an entire poem before deciding what a symbol stands for. A cherry tree cannot symbolize life, for example, unless other details in the poem also lead to that conclusion.

As you read this poem, look for clues that tell what the garden seat represents.

### The Garden Seat

Its former green is blue and thin,  
And its once firm legs sink in and in;  
Soon it will break down unaware,  
Soon it will break down unaware.

At night when reddest flowers are black  
Those who once sat thereon come back;  
Quite a row of them sitting there,  
Quite a row of them sitting there.

With them the seat does not break down,  
Nor winter freeze them, nor floods drown,  
For they are as light as upper air,  
They are as light as upper air!

By Thomas Hardy.

- ▶ What does the seat symbolize?
  - (1) the passage of time
  - (2) the beginning of winter

You are correct if you chose **(1)**. The seat is described as formerly firm but now sinking in; its paint is discolored. Soon it will break down. These are changes that take place over time.

### Images

**Images** are the pictures a poem creates in your mind. Images are based on the five senses: smell, taste, touch, hearing, and especially sight.

- ▶ What does the image of “quite a row of them sitting there,” “light as upper air” refer to?
  - (1) ghosts of people who used to sit on the garden seat
  - (2) the flowers growing around the garden bench

You are correct if you chose **(1)**. If you can imagine “quite a row” of ghosts sitting on the garden bench, “light as upper air,” you can understand and appreciate the poet’s image.

---

## POETRY ► PRACTICE 3

Questions 1 through 6 refer to the following poem.

### WHERE ARE THE BEAVERS LIVING?

#### The Beaver Pool in December

(5) The brook is still open  
where the water falls,  
but over the deeper pools  
clear ice forms; over the dark  
shapes of stones, a rotting log,  
and amber leaves that clattered down  
after the first heavy frost.

(10) Though I wait in the cold  
until dusk, and though a sudden  
bubble of air rises under the ice,  
I see not a single animal.

(15) The beavers thrive somewhere  
else, eating the bark of hoarded  
saplings. How they struggled  
to pull the long branches  
over the stiffening bank . . .

(20) but now they pass without  
effort, all through the chilly  
water; moving like thoughts  
in an unconflicted mind.

Excerpt from “The Beaver Pool in Winter” copyright  
© 1996 by the Estate of Jane Kenyon. Reprinted from  
*Otherwise: New & Selected Poems* with the permission of  
Graywolf Press, Saint Paul, Minnesota.

1. What is the speaker describing when she says  
“clear ice forms; over the dark / shapes of  
stones, a rotting log, / and amber leaves that  
clattered down / after the first heavy frost”  
(lines 4–7)?

- (1) the winter home of the beavers
- (2) an icy waterfall
- (3) the path she is walking on
- (4) the forest floor
- (5) things in the pool under the ice

2. What is symbolized by the image “a sudden /  
bubble of air rises under the ice” (lines 9–10)?

- (1) the eventual coming of spring
- (2) the survival instinct animals have
- (3) the danger that lurks beneath
- (4) the speaker’s hope for life
- (5) the death of the animals in the icy water

3. Which of the following descriptions best fits  
the beavers in winter?

- (1) busy as usual
- (2) relaxed and peaceful
- (3) fighting for survival
- (4) hibernating
- (5) playing by a waterfall

4. What is being described as “like thoughts / in  
an unconflicted mind” (lines 19–20)?

- (1) the smooth motion of the beavers
- (2) the difficult work of the beavers
- (3) the uncomplicated life of animals
- (4) the slow moving water in winter
- (5) the eagerness for the ease of summer

5. Which of the following terms best describes  
the mood of this poem?

- (1) excited
- (2) contemplative
- (3) tragic
- (4) exaggerated
- (5) comical

6. Which of the following activities might the  
speaker of the poem also enjoy?

- (1) playing cards
- (2) working on a computer
- (3) walking along an empty beach
- (4) watching a TV comedy
- (5) attending a football game

Answers and explanations start on page 661.

### Key Ideas

- The theme is the most important idea the poet wants to express.
- To determine the theme of a poem, consider the subject of the poem and the elements used—images, symbols, rhyme, rhythm, and choice of words and ideas.

### GED TIP

Read the GED Test poem all the way through to get a feel for its meaning and mood. Then read it a second time, paying attention to details and figurative language.

## POETRY

# Interpreting Theme

To understand the **theme** of a poem, ask, “What is the most important idea the poet is trying to get across?” The theme is not quite the same thing as the subject.

For example, the subject of a poem might be clouds, but what is the poet trying to tell you about clouds? Does the poem talk about the beauty of passing clouds? Or about the fleeting passage of time represented by clouds? The images, symbols, rhyme, rhythm, and choice of words and ideas in a poem all combine to help express the theme about its subject.

As you read this poem, consider all those elements to determine the theme.

### The Summer Day

Who made the world?  
 Who made the swan, and the black bear?  
 Who made the grasshopper?  
 This grasshopper, I mean—  
 the one who has flung herself out of the grass,  
 the one who is eating sugar out of my hand,  
 who is moving her jaws back and forth instead of up and down—  
 who is gazing around with her enormous and complicated eyes.  
 Now she lifts her pale forearms and thoroughly washes her face.  
 Now she snaps her wings open, and floats away.  
 I don't know exactly what a prayer is.  
 I do know how to pay attention, how to fall down  
 into the grass, how to kneel down in the grass,  
 how to be idle and blessed, how to stroll through the fields,  
 which is what I have been doing all day.  
 Tell me, what else should I have done?  
 Doesn't everything die at last, and too soon?  
 Tell me, what is it you plan to do  
 with your one wild and precious life?

*House of Light* by Mary Oliver. Copyright © 1990 by Mary Oliver. Reprinted by permission of Beacon Press, Boston, MA.

- ▶ What is the subject of this poem?
  - (1) a grasshopper and other aspects of nature
  - (2) the creation of the earth and the need for prayer

You are correct if you chose **(1)**. Most of the images in the poem are of the grasshopper and other aspects of nature, such as fields and grass.

- ▶ What is the theme of the poem?
  - (1) Take the time to observe and appreciate life.
  - (2) We must preserve nature in all its forms.

You are correct if you chose **(1)**. The poet may agree with (2), but the theme is reflected in the last eight lines of the poem.

---

## POETRY ► PRACTICE 4

Questions 1 through 6 refer to the following poem.

### WHAT DO THE CHILDREN FIND?

#### A Postcard from the Volcano

Children picking up our bones  
Will never know that these were once  
As quick as foxes on the hill;

- (5) And that in autumn, when the grapes  
Made sharp air sharper by their smell  
These had a being, breathing frost;
- And least will guess that with our bones  
We left much more, left what still is  
The look of things, left what we felt
- (10) At what we saw. The spring clouds blow  
Above the shuttered mansion-house,  
Beyond our gate and the windy sky  
Cries out a literate despair.  
We knew for long the mansion's look
- (15) And what we said of it became  
A part of what it is . . . Children,  
Still weaving budded aureoles,  
Will speak our speech and never know,
- (20) Will say of the mansion that it seems  
As if he that lived there left behind  
A spirit storming in blank walls,  
A dirty house in a gutted world,  
A tatter of shadows peaked to white,  
Smear'd with the gold of the opulent sun.

From THE COLLECTED POEMS OF WALLACE STEVENS by Wallace Stevens, copyright © 1954 by Wallace Stevens. Used by permission of Alfred A. Knopf, a division of Random House, Inc.

1. What is the meaning of "these were once / as quick as foxes on the hill" (lines 2–3)?
  - (1) The bones used to belong to living people.
  - (2) The bones belonged to foxes on the hill.
  - (3) The children are as quick as foxes.
  - (4) The children don't realize the hill is steep.
  - (5) The days used to go by very fast.
2. Who is the speaker in this poem?
  - (1) a child who has found some bones
  - (2) a man watching children play
  - (3) a person who dreams about the past
  - (4) an abandoned house
  - (5) the dead owner of the house
3. What is being likened to a person because of its cries?
  - (1) the volcano
  - (2) the bones
  - (3) the mansion
  - (4) the wind
  - (5) the sun
4. What will the children say is in the house?
  - (1) their ancestors
  - (2) bones
  - (3) a ghost
  - (4) nothing but shadows
  - (5) dirt and dust
5. Which of the following is the theme of this poem?
  - (1) Children don't realize who and what came before them.
  - (2) Children can play and find joy in anything.
  - (3) Time passes and damages houses and other buildings.
  - (4) A house is only a home when people live there.
  - (5) Spirits sometimes live in old houses.
6. What is the mood of the poem?
  - (1) forgiving
  - (2) scary
  - (3) sad
  - (4) grieving
  - (5) angry

Answers and explanations start on page 661.

## FICTION

## Understanding Plot Elements

**Key Ideas**

- The plot is the series of events in a story. Understanding the order of the events helps you see how they are related.
- The conflict is a problem between characters, between a character and nature, or within a character.

**GED TIP**

To understand the events and conflict in a story on the GED Reading Test, pay attention to the dialogue. Remember that every time the speaker changes, a new paragraph begins.

**Plot** refers to the events in a story. Generally, the events are told in order—what happened first, next, and so on. Understanding the order of events can help you see which events caused or affected others.

A story usually contains at least one **conflict**, or problem. The conflict may be between characters, within a character, or between a character and nature. Conflict creates tension. When it is resolved, the tension ends.

The following excerpt is about a brother and sister whose mother has a tumor. As you read it, look for the order of events and the conflict.

Robert didn't phone until evening. His voice was fatigued and thin. "I've moved her to the university hospital," he said. "They can't deal with it at home."

Kate waited, saying nothing. She concentrated on the toes of her shoes. They needed shining. *You never take care of anything*, her mother would say.

"She has a tumor in her head." He said it firmly, as though Kate might challenge him.

"I'll take a plane tomorrow morning," Kate answered, "I'll be there by noon."

Robert exhaled. "Look," he said, "don't even come back here unless you can keep your mouth shut and do it my way."

"Get to the point."

"The point is they believe she has a malignancy and we're not going to tell her. I almost didn't tell you." His voice faltered. "They're going to operate but if they find what they're expecting, they don't think they can stop it."

For a moment there was no sound except an oceanic vibration of distance on the wire. Even that sound grew still. Robert breathed. Kate could almost see him, in a booth at the hospital, staring straight ahead at the plastic instructions screwed to the narrow rectangular body of the telephone. It seemed to her that she was hurtling toward him.

From "Souvenir" by Jayne Anne Phillips, from *Black Tickets*, N.Y.: Delacorte Press, 1979. Reprinted with permission of Jayne Anne Phillips.

► When did Robert decide not to tell his mother about the tumor?

- (1) before talking to Kate      (2) after discussing the issue with Kate

(1) is correct. Robert has already decided what to do when he calls Kate.

► Which of the following identifies a conflict in this excerpt?

- (1) Kate tells Robert she will fly there tomorrow.  
(2) Robert tells Kate that she must do as he says.

(2) is correct. Robert challenges Kate. That creates tension.



## FICTION ► PRACTICE 1

Questions 1 through 4 refer to the following excerpt from a short story called “The String.”

### WHAT IS THE PEASANT ACCUSED OF?

The countryman looked at the Mayor in astonishment, already terrified by this suspicion resting on him without his knowing why.

- (5) “Me? Me? I picked up the pocket-book?”  
“Yes, you, yourself.”  
“On my word of honor, I never heard of it.”  
“But you were seen.”  
“I was seen, me? Who says he saw me?”  
“Monsieur Malandain, the harness-maker.”
- (10) The old man remembered, understood, and flushed with anger.  
“Ah, he saw me, the clodhopper, he saw me pick up this string, here, Mayor.” And rummaging in his pocket he drew out the little piece of string.
- (15) But the Mayor, incredulous, shook his head.  
“You will not make me believe, Maître Hauchecorne, that Monsieur Malandain, who is a man we can believe, mistook this cord for a pocket-book.”
- (20) The peasant, furious, lifted his hand, spat at one side to attest his honor, repeating:  
“It is nevertheless God’s own truth, the sacred truth. I repeat it on my soul and my salvation.”
- (25) The Mayor resumed:  
“After picking up the object, you stood like a stilt, looking a long while in the mud to see if any piece of money had fallen out.”
- (30) The old fellow choked with indignation and fear. . . .  
He was confronted with Monsieur Malandain, who repeated and maintained his affirmation. They abused each other for an hour. At his own request, Maître Hauchecorne was searched. Nothing was found on him.
- (35) Finally the Mayor, very much perplexed, discharged him with the warning that he would consult the Public Prosecutor and ask for further orders.
- (40)

From COLLECTED NOVELS AND STORIES by Guy de Maupassant, translated by Ernest Boyd, copyright 1922 and renewed 1950 by Alfred A. Knopf, a Division of Random House, Inc. Used by permission of Alfred A. Knopf, a division of Random House, Inc.

1. What was the peasant doing when he “lifted his hand, spat at one side to attest his honor” (lines 21–22)?
  - (1) thinking of striking the Mayor
  - (2) showing his disgust at the accusation
  - (3) swearing that he was telling the truth
  - (4) pleading to the mayor for mercy
  - (5) performing a peasant ritual
2. How did the peasant react when confronted with Malandain, the harness-maker?

He

  - (1) became choked with fear and indignation
  - (2) swore that he did not do it
  - (3) tried to explain what had actually happened
  - (4) became respectful and subdued
  - (5) confronted him and then asked to be searched
3. Which of the following statements best describes the conflict in this excerpt?
  - (1) A town mayor is abusing his authority.
  - (2) Two townspeople do not like each other.
  - (3) A peasant leads a harsh life and is often at odds with others.
  - (4) A peasant is accused of taking a pocket-book.
  - (5) Someone has lost a pocket-book with a great deal of money in it.
4. What is the most likely reason the harness-maker is believed?
  - (1) A string can’t be mistaken for a pocket-book.
  - (2) The peasant was looking in the mud for money.
  - (3) The harness-maker is the Mayor’s friend.
  - (4) The harness-maker is higher in social status than the peasant.
  - (5) Other people saw the peasant pick up a pocket-book.

Answers and explanations start on page 659.



### Key Ideas

- To understand a story, you must make inferences.
- Making inferences means that you look closely at the details in the story, think about your knowledge of the real world, and then ask yourself, “What does this information point to?”

### GED TIP

Try not to leave a question unanswered. If you read a tough question, do your best to think about it, look back at the passage for information you may need, and then choose the best answer.

## FICTION

# Making Inferences

To understand a story, you can’t just rely on what is directly stated. You also need to “read between the lines,” or make **inferences**. An inference is based on information you are given *plus* what you have learned about the real world—the way things happen and the way people act.

As you read this excerpt from a story, look for suggested meanings behind people’s actions and words.

“Last night?” The old blue eyes looked blank, then brightened. “Ah no, I must have taken one of my Seconals. Otherwise I’d have heard it surely. ‘Auntie,’ my niece always says—‘what if there should be a fire, and you there sleeping away?’ Do what she says, I do sometimes, only to hear every pin drop till morning.” She shook her head, entering the elevator. “Going up?”

“N-no,” said Mrs. Hazlitt. “I—have to wait here for a minute.” She sat down on the bench, the token bench that she had never seen anybody sitting on, and watched the car door close on the little figure still shaking its head, borne upward like a fairy godmother, willing but unable to oblige. The car’s hum stopped, then its light glowed on again. Someone else was coming down. . . .

The car door opened. “Wssht!” said Miss Finan, scuttling out again. “I’ve just remembered. Not last night, but two weeks ago. And once before that. A scream, you said?”

Mrs. Hazlitt stood up. Almost unable to speak, for the tears that suddenly wrenched her throat, she described it.

From “The Scream on Fifty-Seventh Street” by Hortense Calisher, from *Tales for the Mirror*, reprinted in *Women and Fiction*, edited by Susan Cahill, New York: New American Library, 1975.

- ▶ What happened before the beginning of this excerpt?
  - (1) Mrs. Hazlitt heard a scream the night before and asked Miss Finan if she heard it too.
  - (2) Mrs. Hazlitt asked Miss Finan about her health and whether she is sleeping well.

The correct answer is (1). You can infer it from details such as “Last night?” and “Not last night, but two weeks ago. And once before that. A scream, you said?”

- ▶ What is the most likely reason that “tears suddenly wrenched” Mrs. Hazlitt’s throat?
  - (1) She was upset at Miss Finan’s inability to remember.
  - (2) She was relieved that Miss Finan had heard a scream too.

You are correct if you chose (2). Mrs. Hazlitt is so relieved that someone else heard the scream that she has to fight back tears.

## FICTION ► PRACTICE 2

Questions 1 through 4 refer to the following excerpt from a short story.

### WHAT DOES THE WOMAN THINK HAS HAPPENED TO HER HUSBAND?

(5) She knew that she would weep again when she saw the kind, tender hands folded in death; the face that had never looked save with love upon her, fixed and gray and dead. But she saw beyond that bitter moment a long procession of years to come that would belong to her absolutely. And she opened and spread her arms out to them in welcome.

(10) There would be no one to live for during those coming years; she would live for herself. There would be no powerful will bending her in that blind persistence with which men and women believe they have a right to impose a private will upon a fellow creature. A kind intention or a cruel intention made the act seem no less a crime as she looked upon it in that brief moment of illumination.

(20) And yet she had loved him—sometimes. Often she had not. What did it matter! What could love, the unsolved mystery, count for in face of this possession of self-assertion, which she suddenly recognized as the strongest impulse of her being!

(25) “Free! Body and soul free!” she kept whispering . . .

(30) Some one was opening the front door with a latchkey. It was [her husband] Brently Mallard who entered, a little travel-stained, composedly carrying his grip-sack and umbrella. He had been far from the scene of accident, and did not even know there had been one. He stood amazed at [his wife] Josephine’s piercing cry; at Richards’ quick motion to screen him from the view of his wife.

(35) But Richards was too late.

When the doctors came they said she had died of heart disease—of joy that kills.

From “The Story of an Hour” by Kate Chopin.

1. How did Brently Mallard generally feel toward his wife?

He

- (1) had always loved her
- (2) kept her at arm’s length
- (3) wanted to get away from her
- (4) liked to play practical jokes on her
- (5) had cruel intentions toward her

2. Which detail best expresses Josephine’s vision of her future?

- (1) that bitter moment
- (2) she’d weep again
- (3) spread her arms out in welcome
- (4) blind persistence
- (5) to impose a private will

3. What was the doctors’ meaning when they said that Josephine died of “joy that kills” (line 37)?

They thought that

- (1) she was overcome and thrilled to see her husband
- (2) she was excited about her upcoming life of freedom
- (3) she was relieved that Brently was back from his trip
- (4) her heart was worn out from giving so much love
- (5) her heart was weakened from the strain of living

4. Why did Josephine die?

- (1) She was overcome with relief.
- (2) She was shocked that she would not be free.
- (3) She was confused by feelings of love and hate.
- (4) She had been weakened by her grief.
- (5) She thought there would be no one to live for.

Answers and explanations start on page 659.

### Key Ideas

- Characters are the people in the story.
- You can understand a character by noting what the narrator tells you directly as well as by inferring from the character's appearance, actions, words, and thoughts.

### ON THE GED

*On the GED Reading Test, a common kind of application question asks you to choose how a character would act in a different situation, based on what you know about the character's personality.*

## FICTION

# Analyzing Character

**Characters** are the people who inhabit a story. The personalities and motivations of characters are often stated directly by the **narrator**—the person telling the story. Sometimes you can also infer characters' personalities or motivations by what they do, what they think, and what they say.

As you read this excerpt, look for details that describe each character.

Axel Olsen was going to paint Helga Crane. Not only was he going to paint her, but he was to accompany her and her aunt on their shopping expedition. Aunt Katrina was frankly elated. Uncle Poul was also visibly pleased. Evidently they were not above kow-towing to a lion. Helga's own feelings were mixed; she was amused, grateful, and vexed. It had all been decided and arranged without her, and, also, she was a little afraid of Olsen. His stupendous arrogance awed her.

The day was an exciting, not easily to be forgotten one. Definitely, too, it conveyed to Helga her exact status in her new environment. A decoration. A curio. A peacock. Their progress through the shops was an event; an event for Copenhagen as well as for Helga Crane. Her dark, alien appearance was to most people an astonishment. Some stared surreptitiously, some openly, and some stopped dead in front of her in order more fully to profit by their stares. “*Den Sorte*” dropped freely, audibly, from many lips.

The time came when she grew used to the stares of the population. And the time came when the population of Copenhagen grew used to her outlandish presence and ceased to stare. But at the end of that first day it was with thankfulness that she returned to the sheltering walls of the house on Maria Kirkplads.

From “Quicksand” by Nella Larsen, in *The Norton Anthology of African American Literature*, edited by Henry Louis Gates, Jr., and Nellie Y. McKay, New York: W.W. Norton, 1997.

- ▶ Which of the following describes Helga?
  - (1) attractive, down-to-earth, embarking on a new life
  - (2) self-centered, smug, enjoys being watched

**Option (1)** is correct. An artist is painting her, suggesting she is attractive. Yet she prefers not to be the center of attention (see the end of the last paragraph).

- ▶ Which of the following would Olsen most likely do at a party?
  - (1) snub the hostess if the wine was below his expectations
  - (2) offer to drive anyone home who needed a ride

**Option (1)** is correct. Apply what you know about people with “stupendous arrogance” (see the end of the first paragraph) to answer this question.

## FICTION ► PRACTICE 3

Questions 1 through 3 refer to the following excerpt from a short story.

### WHAT IS THE WITCH, SPEAKING AS YAJI'S DEAD WIFE, TRYING TO ACCOMPLISH?

- "I shall never forget it," the witch went on. "When you were ill you gave your sickness to me. Our only child, who had to carry on our name, grew weak and thin because there was no rice to fill his empty stomach. Every day the bill collectors were knocking at the door and the rent remained unpaid. Yet I did not complain—not even when I slipped in the dogs' dirt in the lane."
- (5) "Don't talk of it," said Yaji. "You'll break my heart."
- (10) "And then, when through my labors I had saved enough money to buy a kimono, I had to pawn it for your sake and never saw it again. Never again did it come back to me from the pawnbroker's."
- (15) "At the same time you must remember what a pleasant place you are in now," said Yaji, "while I have to worry along down here."
- (20) "What? What is there pleasant about it? It is true that by the help of your friends you erected a stone over my grave, but you never go near it, and you never contribute to the temple to get the priests to say prayers for my soul. I am nothing to you. The stone over my grave has been taken away and put into the wall, where all the dogs come and make water against it. Not a drop of water is ever placed on my grave. Truly in death we suffer all sorts of troubles."
- (25) "True, true," said Yaji.
- (30) "But while you thus treat me with neglect," the witch went on, "lying in my grave I think of nobody but you and long for the time when you will join me in the underworld. Shall I come to meet you?"
- (35) "No, no, don't do that," said Yaji. "It's really too far for you."
- "Well then, I have one request to make."
- "Yes, yes. What is it?"
- "Give this witch plenty of money."

- (40) "Of course, of course."
- "How sad the parting!" cried the witch. "I have yet much to tell you, countless questions to ask you, but the messenger of Hell recalls me!"
- (45) Then, recovering from her trance, the witch twanged her bow.

From "Hizakurige" by Jippensha Ikku in *The Longwood Introduction to Fiction*, Boston: Allyn and Bacon, 1992.

1. Why does Yaji say, "No, no, don't do that . . . It's really too far for you." (lines 35–36)?
  - (1) He does not want to die and go to the underworld.
  - (2) He has no real interest in seeing his wife again.
  - (3) He is frightened about seeing the ghost of his wife.
  - (4) His wife shouldn't have to go to any more trouble.
  - (5) His wife can't really travel to him anyway.
2. Which of the following is the best description of the witch?
  - (1) caring
  - (2) straightforward
  - (3) talented
  - (4) untrustworthy
  - (5) thoughtful
3. Earlier in the story the witch, speaking as Yaji's wife, says, "Ah, what agony I went through when I was married to you—time and again suffering the pangs of hunger and shivering with cold in the winter." Based on this information and the excerpt, what kind of husband did Yaji seem to be?
  - (1) angry
  - (2) kind-hearted
  - (3) timid
  - (4) responsible
  - (5) neglectful

Answers and explanations start on page 659.

### Key Ideas

- The subject of a story is what the story is about.
- The theme of a story is different from the subject. The theme goes beyond the subject and expresses a point of view about life.

### GED TIP

*Read the whole passage carefully but not too slowly before you begin to answer the questions. If you read a question that really stumps you, skip it and go on. You can come back to it. But be sure you also skip that question on your answer sheet.*

## FICTION

# Interpreting Theme

Every story has a subject. The subject might be about fighting a war or growing up in poverty. But there is more to a story than its subject. As a reader, look for what the author is trying to say about the subject. That is the **theme**—the message the author wants the reader to understand. In fiction, the theme is often a statement about life. For example, the theme might be that fighting in a war changes a person’s life forever.

The theme may be directly stated. If it is not, you can infer the theme from the characters’ thoughts and actions and from the things that happen in the story.

As you read the following excerpt, ask yourself what message about the people and their lives the author is trying to tell you.

While the boys were getting the Doctor’s horse, he went to the window to examine the house plants. “What do you do to your geraniums to keep them blooming all winter, Mary? I never pass this house that from the road I don’t see your windows full of flowers.”

She snapped off a dark red one, and a ruffled new green leaf, and put them in his buttonhole. “There, that looks better. You look too solemn for a young man, Ed. Why don’t you git married? I’m worried about you. . . .”

Sometimes the Doctor heard the gossipers in the drugstore wondering why Rosicky didn’t get on faster. He was industrious, and so were his boys, but they were rather free and easy, weren’t pushers, and they didn’t always show good judgment. They were comfortable, they were out of debt, but they didn’t get much ahead. Maybe, Doctor Burleigh reflected, people as generous and warmhearted and affectionate as the Rosickys never got ahead much; maybe you couldn’t enjoy your life and put it into the bank, too.

From “Neighbor Rosicky” by Willa Cather, from *Obscure Destinies*.

- Which of the following statements is the theme of the story?
- (1) A good life is measured in terms of love, not money.
  - (2) People should not gossip about others.

You are correct if you chose **(1)**. Doctor Burleigh’s thoughts at the end of the excerpt help you understand that this is the author’s main message.

- Which of the following details supports the theme?
- (1) Mary Rosicky lovingly “worries” about the doctor.
  - (2) The Rosickys keep out of debt.

Again, you are correct if you chose **(1)**. The flowers Mary grows, the fact that she snaps off one to give the doctor, and her expressed concern for him all show her warmth and happiness. They help support the theme that the doctor reflects on.



## FICTION ► PRACTICE 4

Questions 1 through 5 refer to the following excerpt from a short story.

### WHAT IS MORNING COMPARED TO?

Early morning is the best time. You're fully rested but not awake enough to remember how hard it all is. Morning is like being a child again, and morning before the sun is out is like those

- (5) magic times that you hid under the bed and in between the clothes hanging in your mother's closet. Times when any kind of miracle could come about just as normal as a spider making her web.
- (10) I remember waking up in the dark once when I was very small. I jumped right out of bed and went up next to the screen door on the back porch to see what kind of fantastic thing was going on outside. At first I couldn't see anything but there
- (15) was a clopping sound, nickering, and a deep voice that made me feel calm and wondering. Slowly, coming out from the darkness, I saw a gray shimmering next to a tall black pillar. The shimmer turned into a big horse and the pillar
- (20) became my father holding out an apple and cooing in his bass voice, "Ho! Yeah, boy," even though the horse was tame and eating from his hand.

I drifted into sleep thinking that we were

- (25) poor and didn't own a horse. When I woke up it was light and there was no horse to be seen. I asked my father about it but he told me that I was dreaming—where were poor people like us going to find big gray stallions?
- (30) But there were horse chips behind the barn and hoofprints too.

I decided that it was a magic horse and man that I'd seen. From that day on I believed that magic hides in the early morning. If you get up

- (35) early enough you might find something so beautiful that it would be all right if you just died right then because nothing else in life could ever be better.

From "Gone Fishin'" by Walter Mosley, Baltimore: Black Classic Press, 1997.

1. What effect does the father's explanation have on the boy?

The boy

- (1) believes his father
  - (2) feels confused
  - (3) finds a new explanation
  - (4) no longer trusts his father
  - (5) tries to convince his father
2. Which of the following is the best description of the boy?
- (1) hard-hearted
  - (2) imaginative
  - (3) skeptical
  - (4) chatty
  - (5) lonely
3. What is the most likely reason the boy decides he saw a magic horse and man?
- (1) He wants to believe his dream.
  - (2) He enjoys magic and magicians.
  - (3) He wants to prove his father wrong.
  - (4) The hoofprints prove that he saw a horse.
  - (5) This kind of miracle can happen.
4. Which of the following would the father probably enjoy most?
- (1) daydreaming about the future
  - (2) having enough money to pay some bills
  - (3) keeping his son's hopes up about getting a new bicycle for his birthday
  - (4) telling his son about the tooth fairy
  - (5) sharing ghost stories around a campfire
5. Which of the following statements fits the theme of this story?
- (1) False hopes will not get you anywhere.
  - (2) Dreams really can come true.
  - (3) Adults cannot see what children see.
  - (4) Beauty is in the eye of the beholder.
  - (5) Morning and youth are full of possibility.

Answers and explanations start on page 659.

### Key Ideas

- The style of a piece of writing is determined by the choices a writer makes in words, sentence structure, images, and other devices.
- A story is written from a narrator's point of view. The narrator may be an "outsider" or a character who can reveal only what he or she sees and thinks.

### ON THE GED

*The GED Reading Test will not ask you to identify and use terms such as third person and first person, but you should be able to understand and appreciate the effect these writers' choices have.*

## FICTION

# Interpreting Style and Point of View

### Style

A writer has many choices when deciding how to write a story. A writer may use long, complex sentences; short, clipped sentences; or anything in between. A writer may use flowery or formal language, slang or spoken dialect. One writer may use vivid images or symbols, while another writes a plain, spare story. The individual characteristics that a writer chooses—sentence structure, choice of words, use of images, and other devices—are all part of the writer's **style**.

As you read this excerpt, look for the characteristics that this particular author chose. Ask yourself what effect they have on your understanding of the writing.

The only part of the night I recall without feeling anger or sadness is loading the horses. Andy and I hardly had the fencing up before Brett came along with the first ten or twelve. . . . A couple of roans and an Appaloosa stood out in that first bunch in the starlight, and a bay with a roached mane. Then Ed brought up a second bunch, about fifteen mostly dark but a palomino and two paints in there, I remember. Andy and I shooed them up the ramp, which clattered and thundered under their hooves. It was a cool night, still. I could feel the horses on my skin, their body heat swirling around us. I could . . . hear their nostrils fluttering. I felt hard muscle ripple under my hand when I clapped a hip to steer them around. I felt their tails slap my back, and caught a glint in their bared eyes.

From "Stolen Horses" by Barry Lopez, from *WRITER'S HARVEST 3*, edited by Tobias Wolff, copyright © 2000 by Share Our Strength. Used by permission of Dell Publishing, a division of Random House, Inc.

- ▶ What is the effect of the author's description of the horses?
  - (1) It creates a depth of feeling for the horses' vitality.
  - (2) It provides insight into what the characters are doing.

You are correct if you chose **(1)**. The vivid, descriptive details allow you to imagine the horses and sense their vitality and strength.

### Point of View

Another choice a writer makes is which **point of view** to write from. Will the narrator be outside the story, watching and revealing the characters' actions and perhaps even their thoughts and feelings? If so, the writer will use *third person* point of view. Or will the narrator be a character in the story, able to report only what he or she thinks? In that case, the writer will use *first person* point of view.

- ▶ Which of the following indicates that the narrator is a character and so we can know only his thoughts?
  - (1) "The only part of the night I recall. . . ."
  - (2) "Then Ed brought up a second bunch. . . ."

**(1)** is correct. The narrator tells his own thoughts. A clue is the word *I*.



## FICTION ► PRACTICE 5

Questions 1 through 4 refer to the following excerpt from a short story called “Coach.”

### DOES THIS COACH GET ALONG WITH HIS PLAYERS?

“This apartment your mom found is like an office or something. A studio for her to go to and get away every now and then. . . .”

(5) “She wants to get away from us,” Daphne said.

(10) “Definitely not. She gave me a list, is how this whole thing started. She’s got stuff she wants to do, and you with your school problems and me with the team—we’re too much for her, see? She could spend her entire day on us, if you think about it, and never have one second for herself. If you think about it fairly, Daphne, you’ll agree.” . . .

(15) She made a sigh and marched over to a trash can to deposit her slumping cone. Then she washed up at the children’s drinking fountain and rejoined Coach, who had finished his Brown Cow but had kept the plastic spoon in the mouth.

(20) “What was on this list of Mom’s?” Daphne asked.

“Adult stuff,” Coach said.  
“Just give me an example.”

Coach removed the plastic spoon and cracked it in half.

(25) “Your mother’s list is for five years. In that time, she wants to be speaking French regularly. She wants to follow up on her printmaking.”

“This is adult stuff?” Daphne said.

(30) Coach raised a hand to Bobby Stark. Stark had three malt cups in a cardboard carrier and he was moving toward the parking lot.

“Hey, those all for you?” Coach called out.

“I got a month to get fat, Coach. You’ll have five months to beat it off me,” the boy called back.

(35) The people at some of the tables around Coach’s lit up with grins. Bobby Stark’s parents were grinning.

(40) “Every hit of that junk takes a second off your time in the forty—just remember that!” Coach shouted.

Stark wagged his head ruefully, his cheeks blushing. He pretended to hide the malts behind his arm.

From AN AMATEUR’S GUIDE TO THE NIGHT by Mary Robison, copyright © 2001, reprinted with the permission of The Wylie Agency, Inc.

1. What is Bobby Stark’s attitude?

- (1) He dislikes the coach’s outlook.
- (2) He worries about his weight problem.
- (3) He takes things in stride.
- (4) He is looking forward to the sports season.
- (5) He feels unfairly criticized by the coach.

2. Because of the narrator’s point of view, what does the reader know?

- (1) only Coach’s thoughts and feelings
- (2) only Bobby Stark’s actions
- (3) thoughts and feelings of all the characters
- (4) the actions and speech of the characters
- (5) only Daphne’s thoughts and feelings

3. Through their dialogue, what kind of relationship can you conclude the characters have with each other?

- (1) informal
- (2) tense
- (3) professional
- (4) suspicious
- (5) deteriorating

4. Later in the story, Coach has this discussion with his wife, Sherry: “ ‘It’s like my apartment,’ Sherry said. ‘A place apart.’ Coach cut her off. ‘Don’t go on about how much you love your apartment.’ ”

Based on this information and the excerpt, which of the following best describes Coach in his discussion with Daphne?

- (1) brutally frank
- (2) concerned for Daphne’s feelings
- (3) angry and hostile
- (4) loving and warm
- (5) not entirely honest about his feelings

**Answers and explanations start on page 659.**

# POETRY PRACTICE QUESTIONS

Questions 1 through 6 refer to the following poem.

## WHAT IS THE CEMETERY BEING COMPARED TO?

### Cemetery in the Snow

Nothing is like a cemetery in the snow.  
What name is there for the whiteness upon  
the white?

The sky has let down insensible stones of  
snow

upon the tombs,

- (5) and all that is left now is snow upon snow  
like a hand settled on itself forever.

Birds prefer to cut through the sky,  
to wound the invisible corridors of the air  
so as to leave the snow alone,

- (10) which is to leave it intact,  
which is to leave it snow.

Because it is not enough to say that a  
cemetery in the snow  
is like a sleep without dreams  
or like a few blank eyes.

- (15) Though it is something like an insensible  
and sleeping body,  
like one silence fallen upon another  
and like the white persistence of oblivion,  
nothing is like a cemetery in the snow!

Because the snow is above all silent,

- (20) more silent still upon bloodless slabs:  
lips that can no longer say a word.

“Cemetery in the Snow” by Xavier Villarrutia, translated by Donald Justice, from *NEW POETRY OF MEXICO* by Octavio Paz, edited by Mark Strand, copyright © 1970 by E. P. Dutton & Co, Inc.

Copyright © 1966 by Siglo XXI Editores, S. A. Used by permission of Dutton, a division of Penguin Putnam, Inc.

1. What is the “white” in the question “What name is there for the whiteness upon the white” (line 2)?

- (1) snow
- (2) tombstones
- (3) rocks
- (4) clouds
- (5) frost

2. What observation about birds does the speaker make?

Birds

- (1) don’t want to disturb the snow
- (2) will not fly when it is snowing
- (3) will not fly over the cemetery
- (4) have a hard time during winter
- (5) become invisible in the snow

3. What is one quality on which a cemetery is being compared to snow?

- (1) coldness
- (2) emptiness
- (3) silence
- (4) wetness
- (5) beauty

4. Why is the first line repeated later in the poem (line 18)?

- (1) It seeks to persuade the listener.
- (2) It reveals the speaker is unsure.
- (3) It creates tension behind what the speaker is saying.
- (4) It shows that the speaker’s belief has strengthened.
- (5) It helps further describe the scene.

5. Which of the following statements can you conclude the speaker would make?

- (1) There is nothing as beautiful as a cemetery in the snow.
- (2) Wintertime is more beautiful than summertime.
- (3) Birds are the most interesting animals to observe.
- (4) Silence is an unsettling experience to be avoided.
- (5) Some beautiful things are difficult to explain.

6. What is the mood of the poem?

- (1) quiet
- (2) stormy
- (3) romantic
- (4) contented
- (5) eerie

---

Questions 7 through 10 refer to the following poem.

**WHAT DECISION DOES THIS MAN MAKE?**

**Traveling Through the Dark**

Traveling through the dark I found a deer  
dead on the edge of the Wilson River road.  
It is usually best to roll them into the canyon:  
that road is narrow; to swerve might make more dead.

- (5) By glow of the tail-light I stumbled back of the car  
and stood by the heap, a doe, a recent killing;  
she had stiffened already, almost cold.  
I dragged her off; she was large in the belly.

- My fingers touching her side brought me the reason—  
(10) her side was warm; her fawn lay there waiting,  
alive, still, never to be born.  
Beside that mountain road I hesitated.

- The car aimed ahead its lowered parking lights;  
under the hood purred the steady engine.  
(15) I stood in the glare of the warm exhaust turning red,  
around our group I could hear the wilderness listen.

I thought hard for us all—my only swerving—,  
then pushed her over the edge into the river.

“Traveling through the Dark” copyright © 1962, 1988 by the Estate of William Stafford. Reprinted from *The Way It Is: New & Selected Poems* with the permission of Graywolf Press, Saint Paul, Minnesota.

7. What is the situation with the two deer when the speaker first comes upon them?
- (1) A mother and her fawn are both dead.
  - (2) An unborn fawn is alive in its dead mother.
  - (3) An unborn fawn has been killed inside its mother.
  - (4) A live fawn is lying by its dead mother.
  - (5) A dying mother has given birth to a live fawn.
8. If the poet were reading this poem to an audience, which of the following introductions would he most likely use?
- (1) It was the worst decision I ever made
  - (2) Once upon a time
  - (3) The purpose of this poem
  - (4) A funny thing happened
  - (5) It was a night I'll never forget
9. If the speaker were faced with a difficult decision, what would he most likely do?
- (1) be unable to make a choice and agonize over the indecision
  - (2) ask friends for their opinion, then follow their advice
  - (3) think for a while, then make a determined choice
  - (4) worry he would regret his choice, but do it anyway
  - (5) take the easiest way out and as quickly as possible
10. What kind of person does the speaker appear to be?
- (1) cold-hearted
  - (2) frivolous
  - (3) giving
  - (4) anxious
  - (5) mindful

---

Questions 11 through 14 refer to the following poem.

**WHAT HAPPENED WITH THE FAMILY THAT MORNING?**

**Macular Degeneration**

Something like radiance is crossing my wife's face.  
She won't admit it. I won't press her.

Now, while they happen, here are the facts:  
my son is staring up into his mother's eyes;

- (5) we are standing in the kitchen at the day's beginning,  
half-asleep over mugs of chicory swirling with cream;  
he has just barreled in, five today, demanding  
a cup of juice from her, not me. Not you,  
he repeats. Of course, she fetches it, obedient.
- (10) Of course, I awakened the same slavery in my mother,  
the need to be commanded by a man-child who is other,  
forty years back. What boy could ask his father  
with a glance to be maidservant and Queen of Heaven?  
Tonight I will type my mother a short letter
- (15) since she has written me the facts about her vision—  
that there is no cure for progressive scarring  
of the retina from five years back and now she reads  
slowly with a magnifying glass. I will detail  
the feats of her grandson at his birthday party,
- (20) leaving out this morning's epiphany. Of course,  
the instant he was born she could foresee this moment  
because in her eyes he is her son, diminished,  
and it is no one's business now how she relinquished me.

Excerpt from *THE ASTONISHED HOURS* by Peter Cooley, Carnegie Mellon University Press, 1993. Reprint courtesy of *The Iowa Review*.

11. Which of the following can you infer the speaker wants?
- (1) to have his son ask him for help with everyday things
  - (2) to have his wife pay him more attention
  - (3) to tell his wife to stop waiting on their son
  - (4) to teach his son to be self-sufficient
  - (5) to do things differently so that his own mother will forgive him
12. What did the speaker realize that morning?
- (1) His son loves his mother more than his father.
  - (2) His wife has a radiant beauty about her.
  - (3) Mothers want to do things for their children.
  - (4) His son is now old enough to be more independent.
  - (5) His mother is having problems seeing.
13. Which of the following best describes the tone of the speaker?
- (1) irritated
  - (2) hysterical
  - (3) concerned
  - (4) detached
  - (5) sarcastic
14. Macular degeneration is an eye disease that causes a decreasing ability to see. Based on this information and the poem, what is the meaning of the title?
- It refers not only to the grandmother's vision problems but also to the
- (1) son's refusal to let his father help
  - (2) grandmother's focus on her grandson
  - (3) wife's inability to see her husband's pain
  - (4) wife's inability to see her son as spoiled
  - (5) speaker's inability to see that his mother needs help

---

Questions 15 through 18 refer to the following poem.

### WHAT SHOULD HAPPEN BEFORE SUNSET?

#### Before Sunset

In the lower lands of day  
On the hither side of night,  
There is nothing that will stay,  
There are all things soft to sight;  
(5) Lighted shade and shadowy light  
In the wayside and the way,  
Hours the sun has spared to smite,  
Flowers the rain has left to play.

Shall these hours run down and say  
(10) No good thing of thee and me?  
Time that made us and will slay  
Laughs at love in me and thee;  
But if here the flowers may see  
One whole hour of amorous breath,  
(15) Time shall die, and love shall be  
Lord as time was over death.

By Algernon Charles Swinburne.

15. What is being referred to by “In the lower lands of day” (line 1)?
- (1) in the shade
  - (2) in a valley
  - (3) toward the end of the day
  - (4) during feelings of sadness
  - (5) at dawn
16. What does the speaker mean when he says, “Time that made us and will slay” (line 11)?
- (1) Time has given us a strong love, but it may take it away.
  - (2) Just as we were born and live, sooner or later we will die.
  - (3) Time waits for no one; it goes on endlessly.
  - (4) It is time that we face death.
  - (5) We should not waste the time we have on earth.
17. To whom is the speaker talking?
- (1) his lover
  - (2) the world in general
  - (3) the reader
  - (4) a woman he wants to get acquainted with
  - (5) an old friend
18. Which of the following is the best restatement of “But if here the flowers may see / One whole hour of amorous breath, / Time shall die, and love shall be / Lord as time was over death.” (lines 13–16)?
- (1) Time and love are the two most constant elements in life.
  - (2) As long as we live life for even a short while, then love is the winner, not time.
  - (3) If the flowers live, then time will not laugh at us.
  - (4) If the lovers share their love, then their love will last.
  - (5) If time dies, then all that is left to us is love.

**Answers and explanations start on page 661.**

# DRAMA PRACTICE QUESTIONS

Questions 1 through 5 refer to the following excerpt from a play.

## WHAT IS SADIE TELLING O'HARA?

O'HARA: What's to hinder you repenting in Sydney—just as well as in San Francisco—if you've got to repent?

- SADIE: You don't understand. I've got to go
- (5) back and be punished for what I've been—there's no other way out. I've got to serve my time—then God will forgive me. It's the sacrifice I've got to offer up for the life I've led. Oh, if it would only
- (10) begin at once. It's this waiting for it to start, that's so bad—all these days and days I'll be alone on the boat. I'm weak. I'm afraid. I'm dreadfully afraid. You've got to be very strong, Handsome, to live
- (15) at all. [*Almost as if to herself.*] It will be much easier in the penitentiary.

O'HARA [*in a strange, shocked voice*]: What's that you're saying? The penitentiary?

- (20) SADIE [*with a curious smile*]: When I get to San Francisco, Handsome, I've got to go to the penitentiary for—three years.

O'HARA [*staring back; under his breath*]: God!

- (25) SADIE: Reverend Davidson says it doesn't make any difference whether I was innocent or guilty, of what they framed me for. He says that is God's way of letting me square myself. He says I've got to
- (30) accept an unjust punishment by man as a sacrifice to God.

O'HARA: You just listen to me. Get into your room and throw your clothes on as fast as you can. [*He pulls her from her*

(35) *chair.*]

SADIE: Let go of me—let go! [*She frees herself ferociously; turns on him angrily.*] Don't you dare do that again! I want you to go away. Do you hear? Get right out!

- (40) O'HARA [*brokenly*]: Sadie—Sadie!
- SADIE [*wildly, going R.*]: I mean it! Get right out! Go away—go away.

From *Rain* by John Colton and Clemence Randolph. Used with permission of American Play Company, Inc. (Est. 1898) a subsidiary of American Entertainment Holding Company, LLC.

1. What reason does Sadie give for her insistence on going to the penitentiary?
  - (1) She was guilty of a crime.
  - (2) She has no choice in the matter.
  - (3) She will be forgiven for her misdeeds.
  - (4) Reverend Davidson has forced her.
  - (5) She wants to get away from O'Hara.
2. What is the main conflict between Sadie and O'Hara?
  - (1) O'Hara has learned about Sadie's past.
  - (2) O'Hara thinks Sadie is making a mistake.
  - (3) Sadie no longer loves O'Hara.
  - (4) Sadie distrusts Reverend Davidson.
  - (5) O'Hara is too rough with Sadie.
3. What attitude is motivating O'Hara?
  - (1) admiration for Sadie's choice
  - (2) curiosity about Sadie's past
  - (3) interest in being Sadie's boyfriend
  - (4) concern for Sadie's welfare
  - (5) concern for his own welfare
4. What would O'Hara's reaction likely be if he met Reverend Davidson?
  - (1) argue with him
  - (2) try to trick him
  - (3) ask him to explain
  - (4) turn and walk away
  - (5) laugh at him
5. What mood is created as this scene moves along?
  - (1) eeriness
  - (2) formality
  - (3) resignation
  - (4) finality
  - (5) tension



Questions 6 through 8 refer to the following excerpt from a play.

**DOES BESSIE THINK LIFE IS EASY?**

- (5) BESSIE: Ralphie, I worked too hard all my years to be treated like dirt. It's no law we should be stuck together like Siamese twins. Summer shoes you didn't have, skates you never had, but I bought a new dress every week. A lover I kept—Mr. Gigolo! Did I ever play a game of cards like Mrs. Marcus? Or was Bessie Berger's children always the cleanest on the block?! Here I'm not only the mother, but also the father. The first two years I worked in a stocking factory for six dollars while Myron Berger went to law school. If I didn't worry about the family who would? On the calendar it's a different place, but here without a dollar you don't look the world in the eye. Talk from now to next year—this is life in America.
- (10) RALPH: Then it's wrong. It don't make sense. If life made you this way, then it's wrong!
- (15) BESSIE: Maybe you wanted me to give up twenty years ago. Where would you be now? You'll excuse my expression—bum in the park!
- (20) RALPH: I'm not blaming you, Mom. Sink or swim—I see it. But it can't stay like this.
- (25) BESSIE: My foolish boy . . .
- (30) RALPH: No, I see every house lousy with lies and hate. He said it, Grandpa—Brooklyn hates the Bronx. Smacked on the nose twice a day. But boys and girls can get ahead like that, Mom. We don't want life printed on dollar bills, Mom!
- (35) BESSIE: So go out and change the world if you don't like it.
- (40) RALPH: I will! And why? 'Cause life's different in my head. Gimme the earth in two hands. I'm strong. There . . . hear him? The airmail off to Boston. Day or night, he flies away, a job to do. That's us and it's no time to die.

(45) [The airplane sound fades off as MYRON gives alarm clock to BESSIE, which she begins to wind.]

- BESSIE: “Mom, what does she know? She's old-fashioned!” But I'll tell you a big secret: My whole life I wanted to go away too, but with children a woman stays home. A fire burned in my heart too, but now it's too late. I'm no spring chicken. The clock goes and Bessie goes. Only my machinery can't be fixed. [She lifts a button: the alarm rings on the clock; she stops it, says “Good night,” and exits.]

From *Awake and Sing!* by Clifford Odets.

6. What is Bessie trying to express to her son?
- (1) She wasn't perfect, but she worked hard for her children.
  - (2) She is too old-fashioned to understand young people like him.
  - (3) She feels she should have done more for her children.
  - (4) The world has always been on their side.
  - (5) He is a fine young man and should not let his past hold him back.
7. Which of the following best describes Ralph's attitude toward life?
- (1) Be content with who you are and what you have.
  - (2) Money is the most important thing.
  - (3) Life can be better.
  - (4) Look out for number one—yourself.
  - (5) Love of money is the root of all evil.
8. What does Bessie mean when she says, “Only my machinery can't be fixed” (line 53)?
- (1) When the alarm rings, she is ready to work.
  - (2) An old alarm clock can keep going, but not her aging body.
  - (3) She can't set her life to a specific time or task, like an alarm clock.
  - (4) She knows she lives in the past.
  - (5) She would like to change, but she can't.



Questions 9 through 11 refer to the following excerpt from a play.

### WHY IS BERTA UPSET WITH FIDEL?

FIDEL: Last night on the plaza the Celestina happened to mention it. With a bit of flattery I soon gained the whole story from her.

- (5) BERTA: So that is what you were talking about as you walked around the plaza? [Stands] It must have taken a great deal of flattery to gain so much knowledge from her.
- (10) FIDEL [stands]: Do you not realize what it means? They will need someone to carve the new doors.

[He strikes a pleased attitude, expecting her to say, "But how wonderful, Fidel."]

- (15) BERTA [knowing very well what FIDEL expects, promptly turns away from him, her hand hiding a smile, as she says with innocent curiosity]: I wonder whom Don Nimfo will get? [With the delight of discovery] Perhaps the Brothers Ochóa from Monterrey.
- (20) FIDEL [crestfallen]: He might choose me.

BERTA: You? Hah!

FIDEL: And why not? Am I not the best

- (25) wood carver in the valley?
- BERTA: So you say.
- FIDEL: It would take three years to carve those doors, and he would pay me every week. There would be enough to buy you a trousseau and enough left over for a house.
- (30) BERTA: Did you tell all that to the Celestina?

FIDEL: Of course not! Does a girl help a

- (35) man buy a trousseau for another girl? That was why it had to appear as though I were rolling the eye at her. [He is very much pleased with his brilliance.]
- BERTA: Your success was more than perfect. Today all the world knows that the Celestina has won Berta's man.

FIDEL: But all the world does not know that Fidel Durán, who is I, myself, will carve those doors so as to buy a trousseau

- (40) and house for Berta, my queen.
- (45)

BERTA: Precisely. All the world does not know this great thing. . . . [Flaring out at him] And neither do I!

FIDEL: Do you doubt me, pearl of my life?

- (50) BERTA: Does the rabbit doubt the snake? Does the tree doubt the lightning? Do I doubt that you are a teller of tremendous lies? Speak not to me of cleverness. I know what my own eyes see, and I saw you flirting with the Celestina. Last night I saw you . . . and so did all the world!

From *Sunday Costs Five Pesos* by Josephina Niggli.

9. What reason does Fidel give for flattering Celestina?

- (1) to make Berta jealous  
(2) to win Celestina's affection  
(3) to get the work carving doors  
(4) to make people think he loved her  
(5) to get money from her

10. What does Berta mean when she says, "Does a tree doubt the lightning?" (line 51)?

- (1) There is a spark between Fidel and Celestina.  
(2) The two have nothing in common.  
(3) Fidel is special and compelling, and she is ordinary.  
(4) She distrusts Fidel and fears he will hurt her.  
(5) Fidel will probably cause a disaster.

11. Later in the play Berta says, "My heart is with Fidel. My life is ruined."

Based on this line and the excerpt, which of the following best describes how Berta acts with Fidel in this scene?

- (1) chatty  
(2) playful  
(3) straightforward  
(4) innocent  
(5) dishonest

**Answers and explanations start on page 663.**

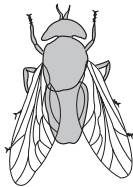
# GED SCIENCE POST-TEST

**Directions:** You will have 80 minutes to answer 50 questions on the GED Science Test. Choose the one best answer to each question.

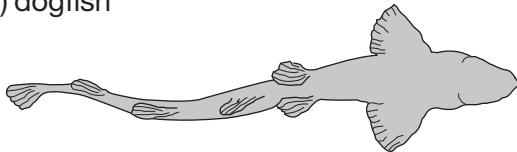
1. Most animals have bodies that are either bilaterally symmetrical or radially symmetrical. If you drew a straight line down the middle of a bilaterally symmetrical animal, the two sides would be mirror images of one another. Such animals have a front end and a rear end. On the other hand, a radially symmetrical animal has a body consisting of similar parts arranged around a center.

Which of the following animals has a radially symmetrical body plan?

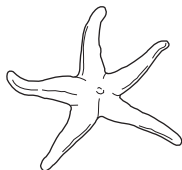
(1) salt marsh greenhead fly



(2) dogfish



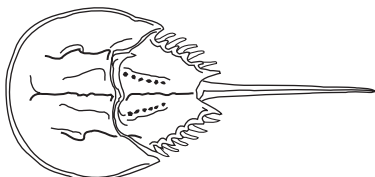
(3) sea star



(4) black skimmer



(5) horseshoe crab



2. In 1969, the U.S. Surgeon General announced that infectious bacterial diseases would soon become a thing of the past because antibiotic drugs had become so effective against them. However, since that time, strains of disease-causing bacteria that are resistant to antibiotics have evolved. Some types of pneumonia and gastrointestinal infections are now untreatable by antibiotics. About 17 million people worldwide still die annually from infectious diseases.

Why was the U.S. Surgeon General's prediction wrong?

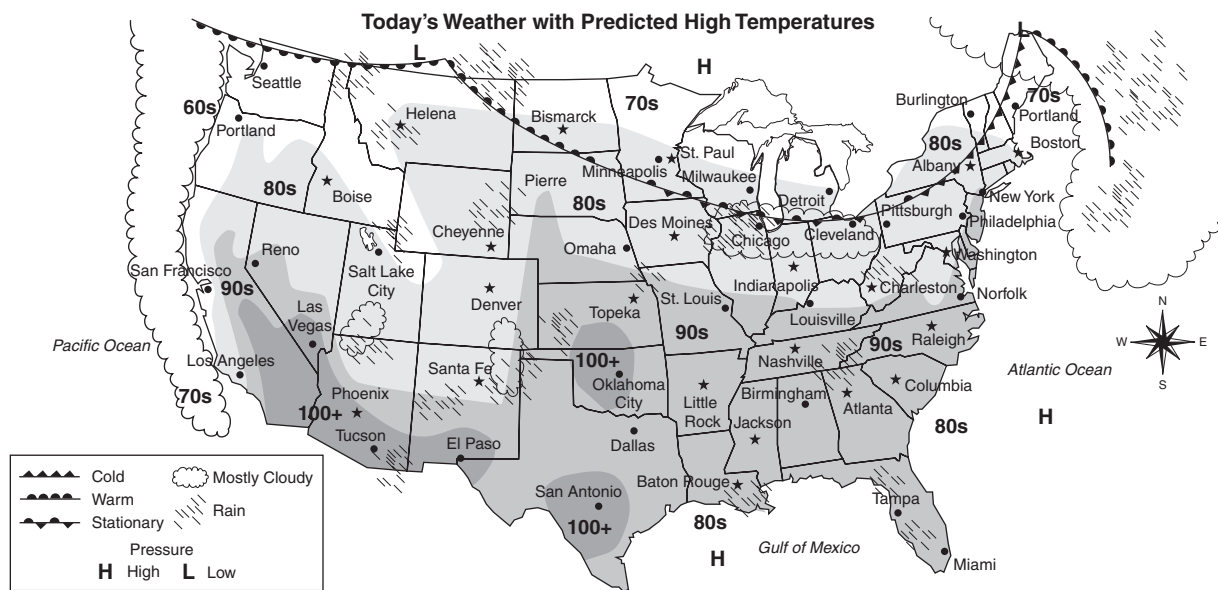
- (1) Antibiotic drugs are not effective against most disease-causing bacteria.
- (2) Infectious diseases are also caused by viruses and parasites.
- (3) Infectious diseases have remained a problem outside the United States.
- (4) Bacteria quickly evolved resistance to antibiotic drugs.
- (5) Some types of pneumonia and gastrointestinal infections can be fatal.

3. If you run too many appliances, like a toaster oven, microwave, and vacuum cleaner, at the same time on the same electrical circuit, the wires can get so hot that they burn away the insulation and cause a fire.

Which of the following devices would prevent this from happening?

- (1) a smoke detector, which sets off an alarm when triggered by smoke
- (2) a portable fire extinguisher, which is used to put out household fires
- (3) a battery, which provides less voltage than household current
- (4) a switch, a device that is used to open and close an electrical circuit
- (5) a fuse, a strip of wire that melts when it gets too hot, breaking an electrical circuit

Questions 4 through 6 refer to the following map.



4. What is the high temperature in Tucson?

- (1) 60s
- (2) 70s
- (3) 80s
- (4) 90s
- (5) 100+

5. What is the main difference between the weather in Minneapolis and Chicago?

- (1) It is raining in Minneapolis but cloudy in Chicago.
- (2) It is clear in Minneapolis but there are showers in Chicago.
- (3) It is in the 80s in Minneapolis but in the 90s in Chicago.
- (4) It is in the 90s in Minneapolis but 100+ in Chicago.
- (5) There is a low-pressure system over Minneapolis and a high-pressure system over Chicago.

6. Which of the following statements is supported by the information on the map?

- (1) The weather is clear and sunny in Baton Rouge and Tampa.
- (2) The Northeast is the only region with temperatures in the 70s.
- (3) It is warmer in Oklahoma City than in Santa Fe.
- (4) There is an area of low pressure and a warm front over the Gulf of Mexico.
- (5) In the United States, air masses usually move from west to east.

7. One property of a gas is that its molecules spread out to fill their container.

Which of the following best illustrates this property of gases?

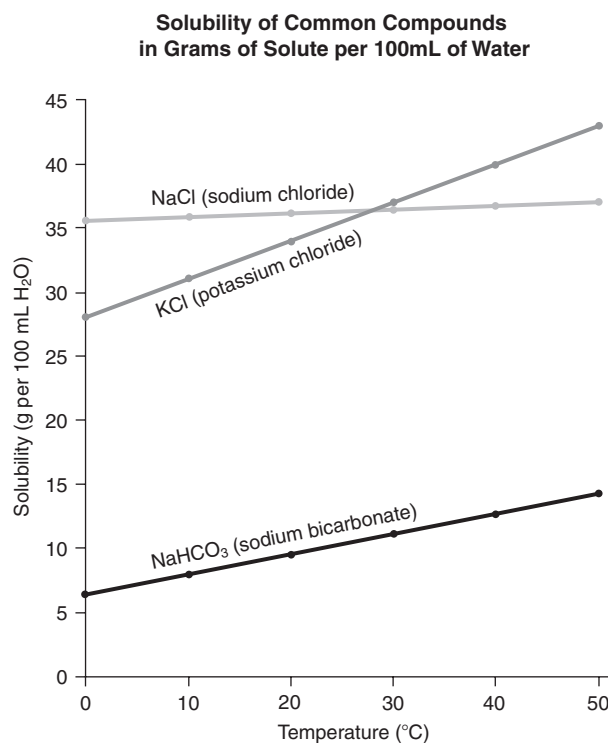
- (1) A helium balloon rises into the atmosphere.
- (2) A teacher's perfume can be detected at the back of the classroom.
- (3) Rain puddles evaporate more quickly when the sun comes out.
- (4) Water is produced when hydrogen gas is burned in oxygen gas.
- (5) Liquid oxygen is denser than gaseous oxygen.

8. For five years, researchers at the University of Wisconsin Medical School ran an experiment in which they evaluated the hearing of 3,753 people between the ages of 48 and 92. Of the group, 46 percent were nonsmokers, 30.3 percent were former smokers, and 14.7 percent still smoked. The scientists found that smokers were nearly 1.7 times as likely as nonsmokers to suffer hearing loss. The study suggests that age-related hearing loss might be preventable.

Which of the following statements is most likely to have been the researchers' hypothesis?

- (1) Smoking has been shown to harm health in many different ways.
- (2) People can reduce their chances of developing age-related hearing loss by not smoking.
- (3) The University of Wisconsin study group consisted of 3,753 people between the ages of 48 and 92.
- (4) Of the group, 46 percent were nonsmokers, 30.3 percent used to smoke, and 14.7 percent still smoked.
- (5) Smokers were nearly 1.7 times as likely as nonsmokers to suffer hearing loss.

Question 9 refers to the following graph.



9. Which of the following statements is supported by the information in the graph?

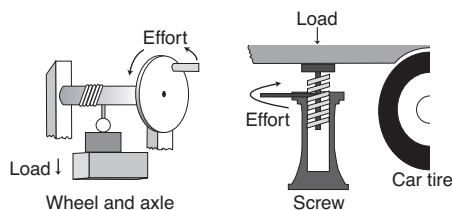
- (1) About 15 grams of sodium bicarbonate will dissolve in 100 mL of water at 10°C.
- (2) About 30 grams of potassium chloride will dissolve in 100 mL of water at 30°C.
- (3) Sodium chloride shows the greatest increase in solubility with increase in temperature.
- (4) For two compounds shown, solubility increases as temperature increases.
- (5) The amount of water does not affect the solubility of the compounds shown.

10. When removed from the body, large organs live only a few hours or days under cold conditions. Therefore, organ transplants must be performed quickly. Many organs go to waste because the organ cannot be transported to an appropriate patient in the short time available. Unfortunately, it is not yet possible to freeze large organs to preserve them for a longer period. That's because they contain many different types of cells, all of which react differently to freezing. Some cells are even destroyed by the ice crystals that form during freezing.

Which of the following studies is most likely to yield information that might help solve the specific problem of freezing whole organs for transplant?

- (1) how the time it takes to locate patients who need organs can be decreased
- (2) how the time it takes to transport organs to their destinations can be decreased
- (3) how special fluids keep insects alive during subfreezing weather
- (4) how radioactive isotopes can be used to diagnose the condition of donated organs
- (5) how the long-term success rate of organ donations can be increased

Question 11 refers to the following diagrams.



11. What do the wheel and axle and the screw have in common?

- (1) Both increase the effort needed to move a load.
- (2) Both use ropes to carry the load.
- (3) Both involve effort applied with circular motion.
- (4) Both involve effort applied with horizontal motion.
- (5) Both involve effort applied with vertical motion.

Question 12 refers to the following chart.

**Melting and Boiling Points**

Element	Melting Point, °F	Boiling Point, °F
Mercury	-38	675
Bromine	19	138
Iron	2,795	5,184
Carbon	6,420	8,720
Gold	1,945	5,379

12. Which of the following statements is supported by the information in the chart?

- (1) Mercury and bromine are liquids at room temperature.
- (2) Iron has a higher melting point than carbon.
- (3) Iron has a higher boiling point than gold.
- (4) Mercury, bromine, iron, carbon, and gold are all metals.
- (5) Mercury has the highest boiling point of the elements listed.

13. Weathering is the breaking down of rock by rain, frost, wind, and other elements. No transport is involved in weathering. The weathered rock remains in place. Weathering can be physical, involving abrasion—the wearing away of a surface—or changes in temperature. It can be chemical, involving chemical reactions. Or it can be organic, involving the action of living things.

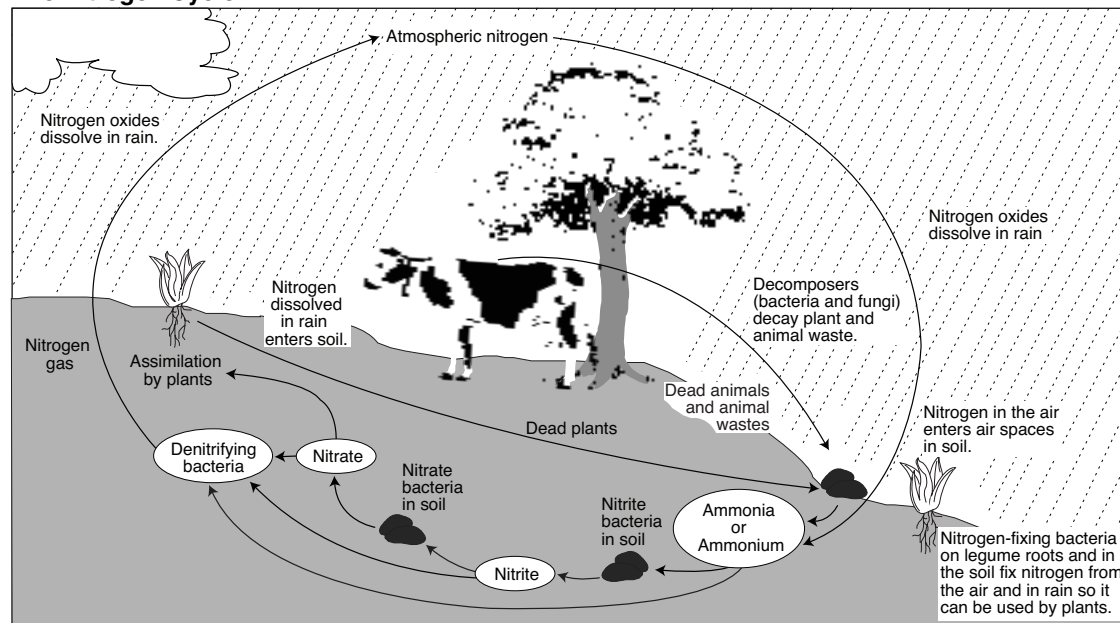
Which of the following is an example of physical weathering?

- (1) the cracking of granite from the expansion of freezing water
- (2) the breakdown of calcite by reaction with acids in rainwater
- (3) the transport of sediment by rivers and glaciers
- (4) the transport of sand by the wind
- (5) the breakdown of crumbling rock in the soil by burrowing worms

Questions 14 through 17 refer to the following information and diagram.

The processes that circulate nitrogen between the atmosphere, land, and organisms are called the nitrogen cycle.

### The Nitrogen Cycle



14. Nitrogen-fixing bacteria are found both in the soil and on the roots of legumes like peas and beans. From where do these bacteria get nitrogen?

- (1) ammonia and ammonium
- (2) the air and rainwater in the soil
- (3) plant and animal proteins
- (4) animals and animal wastes
- (5) animal wastes and decaying plants

15. To increase the nitrogen content of the soil, many farmers spread synthetic fertilizers containing nitrogen compounds. What might an organic farmer, who does not use synthetic fertilizers, do to improve the fertility of the soil?

- (1) use atmospheric nitrogen
- (2) compost with plant and animal wastes
- (3) plant more nonleguminous plants
- (4) switch to crops requiring more nitrogen
- (5) switch to crops that grow faster

16. What do denitrifying bacteria do?

- (1) They turn ammonia into nitrites.
- (2) They turn ammonium into nitrates.
- (3) They help plants assimilate nitrates.
- (4) They take in nitrogen gas from the air.
- (5) They return nitrogen gas to the air.

17. Which of the following statements is a conclusion about the nitrogen cycle rather than a supporting statement?

- (1) Nitrogen oxides dissolve in rainwater.
- (2) Nitrogen-fixing bacteria are found both in the soil and on the roots of legumes.
- (3) The recycling of nitrogen through the biosphere involves many complex processes.
- (4) Decomposers break down plant and animal waste, releasing ammonia.
- (5) Nitrite bacteria turn ammonia and ammonium into nitrites.



18. In a fire, hydrocarbon molecules react with oxygen to produce heat and light as well as carbon dioxide and water. This process is called combustion. Air heated by the fire rises, and cool oxygen-rich air flows in below. The movement of air around a fire causes it to flicker. Scientists have found that the flickering of a fire differs from the flickering of all other light sources.

Which of the following devices makes use of this property of fire?

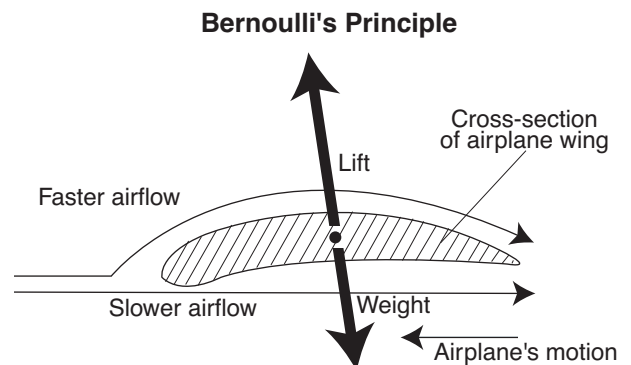
- (1) an internal combustion engine
  - (2) a flame detector
  - (3) a smoke detector
  - (4) a dripless candle
  - (5) an oil burner
19. In 1861, Charles Darwin, a naturalist who formulated the theory of evolution, remarked that the science of geology had made much progress in his lifetime. He wrote, "About thirty years ago there was much talk that geologists ought only to observe and not theorize; and I well remember someone saying that at this rate a man might as well go into a gravel-pit and count the pebbles and describe the colors. How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service!"

Which of the following statements best summarizes Darwin's view of the role of observation in science?

- (1) Observation is the best way to gather facts about any aspect of nature, including geology.
- (2) Observation is a useful part of the scientific method as long as it is supported by statistics.
- (3) Observation is a good method of gathering information only when experimentation is impossible.
- (4) Observation should be used as a method of gathering information only in the field of geology.
- (5) Observation is a useful part of the scientific method as long as the results are used to support or disprove a hypothesis.

Question 20 refers to the following paragraph and diagram.

Bernoulli's principle states that the pressure in a fluid decreases as the speed of the fluid increases. An airplane's wing, which is shaped to speed up airflow and thus reduce pressure on the top side of the wing, makes use of this principle.



20. Which vertical force holds an airplane up?

- (1) Bernoulli's principle
- (2) lift
- (3) weight
- (4) air resistance
- (5) airflow



Question 21 refers to the following chart.

Some Major Oil Spills

Year	Description	Gallons (millions)
1979	Blowout of well in Gulf of Mexico oil field	180
1979	Collision of <i>Atlantic Empress</i> and <i>Aegean Captain</i> in Caribbean	111
1983	Blowout of well in Persian Gulf oil field	180
1989	Grounding of <i>Exxon Valdez</i> off Alaska coast	11
1991	Release of oil in Persian Gulf by Iraqi troops at end of Persian Gulf War	240
1996	Grounding of <i>Sea Empress</i> off Wales coast	19

SOURCE: *Scientific American Science Desk Reference*. New York, Wiley, 1999

21. What does the person who compiled the data in this chart take for granted that you know?

- (1) The worst oil spill on record was deliberately started.
- (2) *Atlantic Empress*, *Aegean Captain*, *Exxon Valdez*, and *Sea Empress* are oil tankers.
- (3) When oil wells blow out, a relatively large oil spill results.
- (4) About 11 million gallons of oil were spilled in the *Exxon Valdez* accident.
- (5) About 19 million gallons of oil were spilled when the *Sea Empress* ran aground off the coast of Wales.

22. Atoms are composed of protons (positive charge), neutrons (no charge), and electrons (negative charge). Because an atom has an equal number of protons and electrons, it has a total charge of zero.

What would happen if an atom lost an electron?

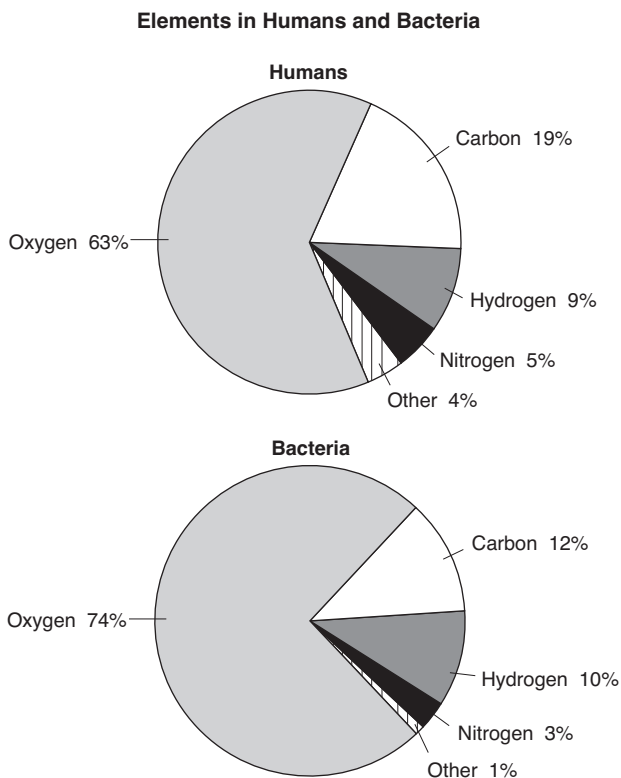
- (1) Its charge would become positive.
- (2) Its charge would become negative.
- (3) Its charge would remain neutral.
- (4) Its neutrons would gain a positive charge.
- (5) Its neutrons would gain a negative charge.

23. The life cycle of many plants, including spore-producing plants like ferns, takes place in two generations that alternate: the gametophyte generation and the sporophyte generation. In ferns, the gametophyte is a very small, heart-shaped structure. During the gametophyte generation, sex cells are produced, two of which fuse to produce a zygote. The zygote grows into the sporophyte. In ferns, the sporophyte is the familiar green plant with leaves, stems, and roots. During the sporophyte generation, gametes, which grow into the gametophyte, are produced.

Which of the following conclusions is supported by this information?

- (1) Ferns are the only plants that have different forms in alternating generations.
- (2) Seed plants reproduce either sexually or asexually.
- (3) Most people would not recognize the gametophyte generation of a fern.
- (4) Some animal life cycles consist of alternating generations with different forms.
- (5) All plants that reproduce sexually have leaves, stems, roots, and flowers.

Question 24 refers to the following graphs.



24. What is one of the main differences between the composition of humans and that of bacteria?

- (1) Humans contain nitrogen, and bacteria do not.
- (2) Humans contain elements other than oxygen, carbon, nitrogen, and hydrogen and bacteria do not.
- (3) Humans contain a higher percentage of oxygen than bacteria do.
- (4) Humans contain a higher percentage of hydrogen than bacteria do.
- (5) Humans contain a higher percentage of carbon than bacteria do.

25. In the cheese-making process, milk is separated into solid curds and liquid whey through the action of starter bacteria and a curdling agent. The curds are then drained, cooked, pressed, and salted to remove the whey. The final stage of cheese making is ripening. To make Swiss-type cheese, a special type of bacterium is added with the starter bacteria. During ripening, this special bacterium feeds on the lactic acid produced by the other bacteria, and it produces large amounts of carbon dioxide. The gas collects as large bubbles throughout a properly ripened Swiss-type cheese.

What forms the holes in Swiss-type cheese?

- (1) lactic acid
- (2) starter bacteria
- (3) carbon dioxide gas
- (4) whey
- (5) curds

26. During various periods in Earth's history, average global temperatures have dropped, resulting in ice ages. During an ice age, glaciers cover large regions of Earth. Scientists disagree about what causes ice ages. One theory suggests that there have been long-term changes in Earth's orbit, causing the planet to periodically move farther from the sun. Another theory proposes that a periodic increase in volcanic activity increases the dust in the atmosphere, blocking the sun's rays. Still another theory suggests that changes in Earth's own radiant energy cause ice ages. Yet another theory proposes that changes in the direction of ocean currents causes ice ages.

Which of the following statements is a fact rather than an opinion, hypothesis, or theory?

- (1) During an ice age, temperatures drop and ice covers vast areas of Earth.
- (2) Changes in Earth's orbit may cause temperature fluctuations and ice ages.
- (3) Large amounts of volcanic dust blocking the sun's energy may cause ice ages.
- (4) Changes in the Earth's own radiant energy may cause ice ages.
- (5) Changes in the direction of ocean currents may cause ice ages.

Questions 27 and 28 refer to the following information.

Vertebrates are animals with backbones. They are grouped into seven classes:

**Mammalia.** Animals with fur or hair; females produce milk to feed the young; most dwell on land; squirrels are an example.

**Aves.** Birds, with feathers; most capable of flight; pigeons are an example.

**Reptilia.** Animals that live mainly on land, with tough skin to withstand dry habitats; snakes are an example.

**Amphibia.** Animals that develop in water, undergo metamorphosis—a change in body form, and often live as adults on land; salamanders are an example.

**Osteichthyes.** Fish with a skeleton made of bone, such as tuna.

**Agnatha.** Jawless fish with a mouth that functions as a suction cup; lampreys are an example.

**Chondrichthyes.** Fish with skeletons of flexible cartilage rather than of bone; sharks are an example.

27. At Sting Ray City in the Cayman Islands, snorkelers and scuba divers can swim with sting rays, cartilaginous fish with a flattened body and large fins. To which class of vertebrates do sting rays belong?

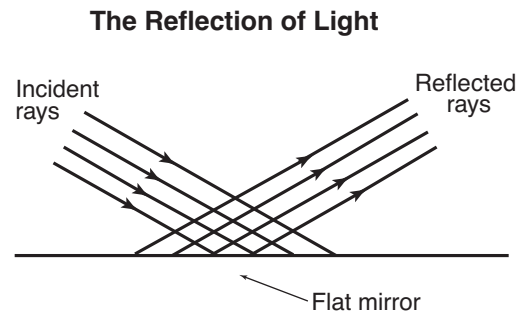
- (1) Mammalia
- (2) Reptilia
- (3) Amphibia
- (4) Osteichthyes
- (5) Chondrichthyes

28. At a natural history museum, an exhibit shows the life cycle of a frog, from the newly hatched, legless tadpole with gills, to the mature frog with legs and lungs. To which class of vertebrates do frogs belong?

- (1) Mammalia
- (2) Reptilia
- (3) Amphibia
- (4) Osteichthyes
- (5) Agnatha

Question 29 refers to the following paragraph and diagram.

Light waves travel in a straight line, but when they strike most surfaces, they bounce off; this is known as reflection. When light is reflected off a smooth surface like a mirror, the incoming rays, called the incident rays, hit the surface at the same angle as the reflected rays bounce off it.



29. In the diagram above, all of the reflected light rays are parallel. Under which of the following circumstances would the reflected light rays travel in many different directions?

- (1) if the source of light were distant
- (2) if the source of light were dim
- (3) if the surface were irregular or rough
- (4) if the surface were perfectly flat
- (5) if the incident rays were parallel

30. In a chemical reaction, the atoms of the reactants are rearranged to form products with different chemical and physical properties. A catalyst is a substance that speeds the rate at which a chemical reaction takes place. The catalyst itself is unchanged at the end of the reaction.

In which of the following reactions is a catalyst at work?

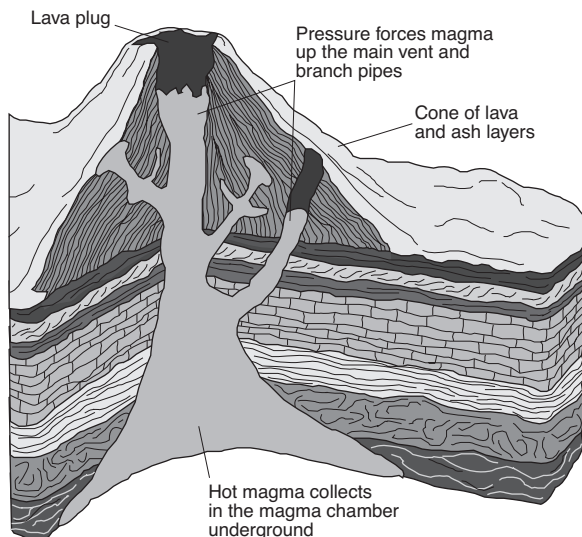
- (1) when an acid is neutralized, as when hydrochloric acid is added to sodium hydroxide yielding sodium chloride and water
  - (2) when food is digested, as when an enzyme in saliva called ptyalin breaks down starch into sugars without itself changing
  - (3) when nitrogen dioxide is heated, causing the gas to break down and form oxygen and nitrogen monoxide
  - (4) when copper is oxidized by combining with nitric acid to yield copper nitrate, nitrogen dioxide, and water
  - (5) when baking soda is heated, causing the sodium bicarbonate to break down, yielding carbon dioxide gas as a byproduct
31. There are an estimated 17 million to 22 million animals in scientific research facilities in the United States. To scientists and many others, animal research provides a way to learn about living organisms, develop treatments for disease, and experiment with genetics, obtaining knowledge that will ultimately benefit people. To others, animal research is a barbaric, outdated practice that should be outlawed.

People who oppose animal research are likely to hold certain values. Which or the following are they most likely to favor?

- (1) genetic testing
- (2) genetic counseling
- (3) animal rights
- (4) cloning
- (5) individualism

Question 32 refers to the following diagram.

### Structure of a Volcano

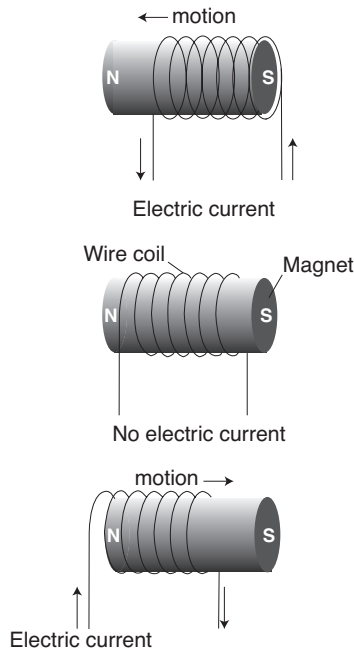


32. Based on the diagram, what causes a volcano to erupt?

- (1) Pressure builds up inside the magma chamber and vent.
- (2) Magma flows down toward the underground chamber.
- (3) The lava plug at the top of the main vent wears away.
- (4) The lava plug at the top of the main vent collapses inward.
- (5) The volcano can no longer bear the weight of layers of lava and ash.

Questions 33 and 34 refer to the following diagrams.

### Induced Electric Current



33. What causes an electric current to flow?

- (1) the coil of wire
- (2) the north pole of the magnet
- (3) the south pole of the magnet
- (4) the movement of the magnet
- (5) the shape of the magnet

34. Which of the following statements is supported by the information in the diagram?

- (1) Each magnet has two north poles and two south poles.
- (2) The opposite poles of two magnets attract each other.
- (3) When the magnet changes direction, the current changes direction.
- (4) Batteries as well as moving magnets can induce an electric current.
- (5) Electric current consists of the flow of electrons.

35. Supercomputers are the fastest, most powerful types of computers, performing operations on huge amounts of data at extraordinary speeds. Supercomputers are used in many scientific disciplines, including fluid dynamics, aerodynamics, and nuclear physics.

Which of the following is implied by this information?

- (1) In time, supercomputers will replace personal computers for most business and household uses.
- (2) Supercomputers differ from personal computers only in their speed of operations.
- (3) The computations performed by supercomputers can also be done with electronic calculators.
- (4) The first electronic computer built in 1943, the Colossus, was a supercomputer.
- (5) Fluid dynamics, aerodynamics, and nuclear physics are fields in which large data sets must be analyzed routinely.

36. Drinking too much water can cause a marathon runner to collapse or even die after a race. Here is why: During heavy exercise, blood is diverted to the muscles, so the intestines cannot absorb all the water a runner drinks. Once the race is over, all of the excess water quickly enters the bloodstream, reducing the concentration of salt in the blood. In turn, the brain swells and water is released into the lungs. Although the treatment is simple—adding salt to the blood—the condition is often mistaken for heart trouble because of fluid in the lungs and the circumstances during which the patient collapsed.

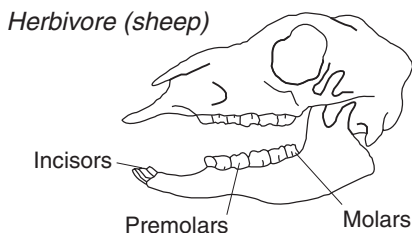
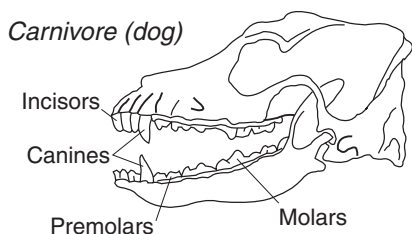
Which of the following would help prevent the salt imbalance that leads runners to collapse?

- (1) eating less the day before a marathon
- (2) running the marathon more quickly
- (3) drinking more water than usual during a marathon
- (4) drinking only the amount of water the runner actually loses during a marathon
- (5) carrying one's medical history when running a marathon

Question 37 refers to the following paragraph and diagram.

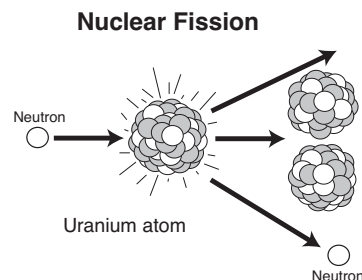
Herbivores are animals that eat only plants; carnivores are animals that eat animals. Typical herbivore and carnivore teeth patterns are shown below.

### Typical Teeth Patterns in Carnivores and Herbivores



37. What is the most important difference between the dog's teeth and the sheep's teeth?
- (1) The dog has fewer teeth than the sheep does.
  - (2) The dog has molars and the sheep does not.
  - (3) The dog has premolars and the sheep does not.
  - (4) The dog has incisors and the sheep does not.
  - (5) The dog has canines and the sheep does not.

Question 38 refers to the following diagram.



38. In the nuclear fission reaction shown above, what is the function of the neutron on the left?
- (1) to split the uranium atom
  - (2) to attract the protons in the nucleus of a uranium atom
  - (3) to attract the electrons in the nucleus of a uranium atom
  - (4) to combine with an atom of uranium
  - (5) to neutralize radioactive waste
39. Coevolution is the development, over time, of complementary features in two different species as a result of their interaction. For example, flowering plants are pollinated by insects. The flowers have developed a color or smell that attracts insects and a shape that allows insects to reach the nectar and remove pollen. The insects, in turn, have evolved sensory organs to find the flowers and mouthparts that can reach the nectar. Thus coevolution benefits both species: the insects help the flowering plants reproduce, and the flowering plants provide food for the insects.
- Based on the information above, which of the following is a general conclusion, rather than a specific fact?
- (1) Flowering plants and insects frequently interact with one another.
  - (2) The shape and color of a flower attract insects.
  - (3) The insects get nourishment from the plant's nectar.
  - (4) The insects aid in plant reproduction.
  - (5) Coevolution provides benefits to both species.



Question 40 refers to the following paragraph and chart.

Each mineral has a characteristic hardness. On the Mohs scale, hardness increases as you go from 1 to 10. A mineral will scratch any other mineral that has a lower number, and be scratched by any other mineral that has a higher number.

**Mohs Scale of Hardness**

Number	Defining Mineral
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase
7	Quartz
8	Topaz
9	Corundum
10	Diamond

40. A hobbyist has a steel file with a hardness of 6.5. Which of the following minerals will she be able to file?
- (1) orthoclase
  - (2) quartz
  - (3) topaz
  - (4) corundum
  - (5) diamond

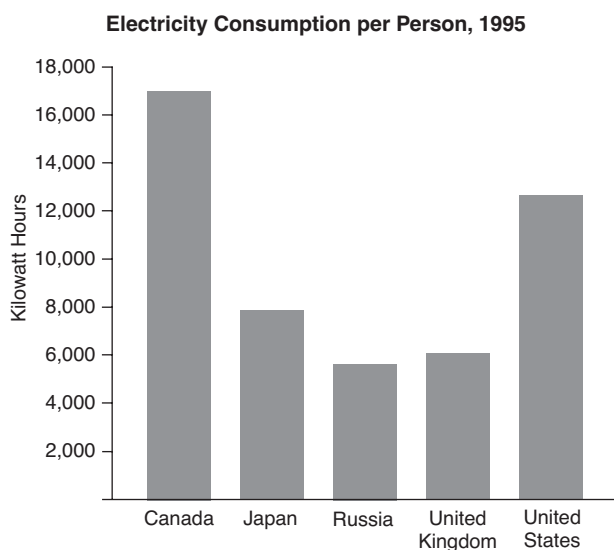
Questions 41 and 42 refer to the following passage.

Since 1997, when Dolly the sheep became the first clone, scientists have cloned several other types of mammals, including mice, cows, pigs, and goats. Scientists' first fears, that clones would age rapidly or die of cancer, proved unfounded. However, the clones have often had other problems, such as developmental delays, heart defects, lung problems, and faulty immune systems. Sometimes a clone appears to be normal and then suddenly develops a problem as it matures. According to scientists, the evidence indicates that cloning can introduce random errors into the clone's DNA. The altered genes can halt embryonic or fetal development, kill the clone soon after birth, or eventually lead to major medical problems. On the other hand, the clone may develop normally, as Dolly the sheep has.

41. Why is it not always possible to tell right away whether a cloned animal has serious genetic abnormalities?
- (1) Most clones do not have any genetic abnormalities.
  - (2) Most genetic abnormalities are very minor and do not affect the clone's health.
  - (3) Some genetic abnormalities do not appear until the clone matures.
  - (4) Most genetic abnormalities express themselves in ways scientists have never seen before.
  - (5) Most clones die at the embryo or fetal stages of development.
42. The idea that cloning may cause genetic abnormalities supports which of the following actions?
- (1) a ban on human cloning
  - (2) a ban on genetic research
  - (3) compulsory genetic testing
  - (4) compulsory DNA fingerprinting
  - (5) lifetime quarantine of cloned animals



Question 43 refers to the following graph.



SOURCE: United Nations Development Programme

43. According to the graph, which of the following nations consumed the least electricity per person in 1995?

- (1) Canada
- (2) Japan
- (3) Russia
- (4) United Kingdom
- (5) United States

44. The heat of vaporization is the amount of heat energy that is carried away from a liquid for each gram of liquid that the heat vaporizes, or turns into a gas.

In which of the following situations does the heat of vaporization play an important role?

- (1) the melting of ice in the palm of your hand
- (2) the cooling you feel as sweat evaporates
- (3) the burning sensation when you touch very hot water
- (4) the cooling effect of drinking ice water on a warm day
- (5) the warmth you feel when you rub your hands together

Question 45 refers to the following information.

Animals reproduce in several ways.

**Sexual reproduction.** The union of an egg and a sperm from a female and a male produces an offspring.

**Parthenogenesis.** An egg develops without any genetic material from a male.

**Self-fertilization.** An organism with both male and female sex organs produces an offspring.

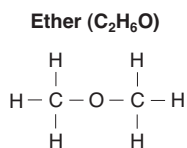
**Hermaphroditism.** Two organisms, both with male and female sex organs, cross-fertilize to produce offspring.

**Fragmentation.** Parts of an organism break away and form new organisms.

45. To take advantage of good environmental conditions, aphids can produce offspring that develop from the genetic material in their eggs. What type of reproduction is this?

- (1) sexual reproduction
- (2) parthenogenesis
- (3) self-fertilization
- (4) hermaphroditism
- (5) fragmentation

Question 46 refers to the following diagram.



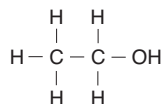
**Key**

C = Carbon

H = Hydrogen

O = Oxygen

**Ethanol (C<sub>2</sub>H<sub>5</sub>OH)**



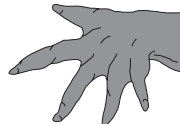
46. What is the main difference between the hydrocarbons ether and ethanol?

- (1) Ether has carbon, hydrogen, and oxygen atoms, and ethanol has only carbon and hydrogen atoms.
- (2) Ether has three carbon atoms and ethanol has two carbon atoms.
- (3) Ether has one oxygen atom and ethanol has two oxygen atoms.
- (4) The total number of carbon, hydrogen, and oxygen atoms in the two hydrocarbons is different.
- (5) The arrangement of the carbon, hydrogen, and oxygen atoms in the two hydrocarbons is different.

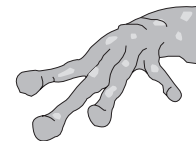
Question 47 refers to the following diagrams.

### Amphibian Feet Adaptations

The salamander has strong, flat feet used for digging as well as walking.



The sticky pads on a tree frog's feet allow it to grip branches and leaves.



With its webbed feet, the newt is a good swimmer.



47. Which of the following statements is a conclusion about amphibian feet rather than a supporting statement?

- (1) Feet are adapted to each amphibian's habitat and lifestyle.
- (2) The newt has a webbed foot designed for swimming.
- (3) The salamander's foot is flat and muscular.
- (4) The tree frog's foot enables it to hold on to leaves and branches.
- (5) The salamander uses its feet for walking and digging.

48. A student did an experiment to see how far a ball would roll on different surfaces. He made five different ramps, each with a different surface: a plain pine board, a painted board, a board covered with sandpaper, a board covered with indoor-outdoor carpet, and a board covered with shag carpet. He set up his experiment on a smooth, level floor. To make the ramps, he raised one end of each board with a book. He collected four copies of the science textbook his class was using and set up four of the ramps with these books. He couldn't find a fifth copy of the book, so he used a thinner science study guide to set up the fifth ramp. He rolled a tennis ball down each ramp and measured how far the ball traveled each time. Then he compiled his data and drew conclusions.

Why was the student's experiment flawed?

- (1) The student should have used a ball with a smooth surface rather than a tennis ball.
- (2) The student should have use books of the same height for all of the ramps.
- (3) The student should not have used sandpaper as one of the surfaces.
- (4) For a control, the student should have rolled the ball across a piece of wood that was level.
- (5) For a control, the student should have rolled the tennis ball across the floor.

49. Sleep may have evolved in humans for several reasons. First, people were unable to hunt, gather food, or travel in the dark, so they were safer from predators asleep in a cave or other shelter. Second, sleep provides an opportunity to repair our body's cells, especially those in the brain. Third, our body temperature is lower during sleep, which conserves energy. Fourth, during deep sleep the pituitary gland releases a growth hormone, so sleep may play a role in growth.

Which of the following is the best title for this paragraph?

- (1) Sleep
- (2) Sleep and Growth
- (3) Our Brains During Sleep
- (4) Why We Sleep
- (5) The Role of Deep Sleep

Question 50 refers to the following chart.

The Five Largest Asteroids

Name	Average distance from sun (Earth = 1)	Time to orbit sun
Ceres	2.77	4.6 years
Pallas	2.77	4.6 years
Vesta	2.36	3.6 years
Hygeia	3.13	5.5 years
Interamnia	3.06	5.4 years

50. Which of the following statements is supported by the information in the chart?

- (1) Ceres, with a diameter of 584 miles, is the largest asteroid in the solar system.
- (2) Pallas is further away from the sun than Hygeia is.
- (3) Of the five largest asteroids, Vesta has the longest orbital period.
- (4) The five largest asteroids are all farther from the sun than Earth is.
- (5) Of the five largest asteroids, only Interamnia takes more than five years to orbit the sun.

Answers and explanations start on page 620.

# LIFE SCIENCE PRACTICE QUESTIONS

**Directions:** Choose the one best answer to each question.

1. Cell membranes are selectively permeable, allowing some substances to pass through and blocking others. The movement through the cell membrane takes place by means of passive or active transport. In passive transport, materials like water move through the membrane without using any of the cell's energy. In active transport, the cell uses energy to move substances in and out. For example, transport proteins use energy when they carry molecules into and out of the cell.

What is the main difference between passive transport and active transport?

- (1) Active transport involves the passage of water, and passive transport does not.
- (2) Active transport requires the cell to move, and passive transport does not.
- (3) Active transport requires the cell to use energy, and passive transport does not.
- (4) Active transport is used by animal cells, and passive transport is used by plant cells.
- (5) Active transport takes substances out of the cell, and passive transport brings them in.

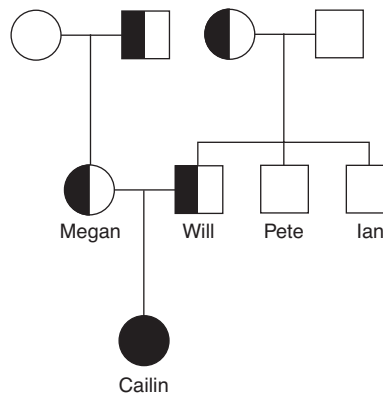
2. An ecologist is a scientist who studies the relationship between living things and their environment.

Which of the following is most likely to be studied by an ecologist?

- (1) biochemical processes involved in producing energy in a cell
- (2) classification of organisms according to evolutionary relationships
- (3) structure and function of mammalian reproductive systems
- (4) role of the immune system in organ transplants
- (5) species interactions in saltwater marshlands

Questions 3 and 4 refer to the following information and diagram.

A pedigree shows the pattern of inheritance of a trait in a family. In a pedigree, circles represent females; squares represent males. A completely shaded shape indicates that the person has the trait. A half-shaded shape indicates the person carries the recessive form of the gene for the trait but does not have the trait. An unshaded shape indicates the person neither has nor carries the trait. In the following pedigree, Megan is a carrier of the genetic disorder cystic fibrosis, although she is healthy.



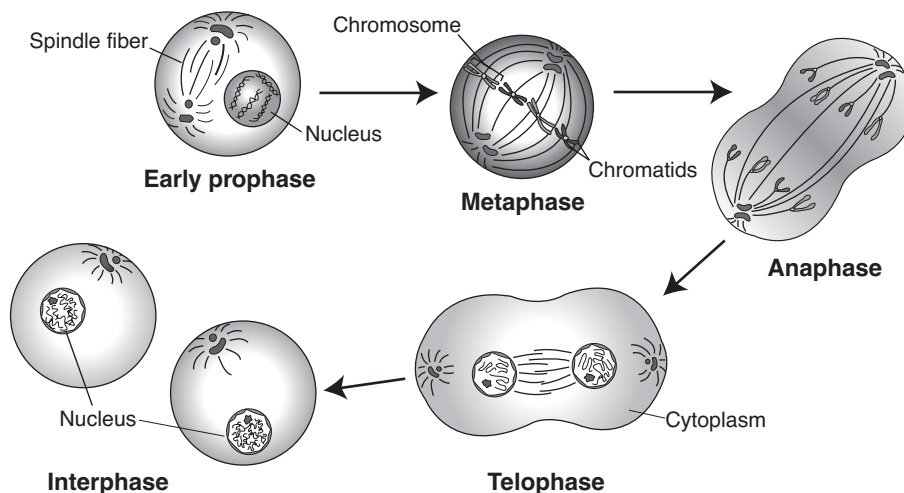
3. Which of the following people is a carrier of cystic fibrosis?

- (1) Megan's mother
- (2) Megan's father
- (3) Will's father
- (4) Pete
- (5) Ian

4. Which of the following best explains why Megan's and Will's families were surprised to learn Cailin had inherited cystic fibrosis?

- (1) Megan and Will are carriers of cystic fibrosis.
- (2) Pete and Ian are not carriers of cystic fibrosis.
- (3) Will's parents do not have cystic fibrosis.
- (4) Megan's father and Will's mother are carriers of cystic fibrosis.
- (5) No one in either family has cystic fibrosis except Cailin.

Questions 5 through 7 refer to the following diagram and paragraph.



Mitosis is a type of cell division in which two daughter cells that have the same genetic material as the parent cell. Before mitosis starts, each chromosome in the nucleus duplicates itself to produce two sections, called chromatids, that are linked.

5. During which stage do the chromosomes line up across the middle of the cell?

- (1) early prophase
- (2) metaphase
- (3) anaphase
- (4) telophase
- (5) interphase

6. What is the function of the spindle during mitosis?

- (1) to duplicate the chromosomes
- (2) to control the movement of chromosomes
- (3) to dissolve the nuclear membrane
- (4) to pinch the cell membrane
- (5) to help divide the cytoplasm for the two daughter cells

7. Bacteria divide by mitosis. Which of the following gives the best evidence for how a bacterial infection can spread quickly when the body's immune system cannot control it?

- (1) Bacterial cells are very mobile and can move quickly through the cytoplasm.
- (2) Bacterial cells are transported throughout the body in the blood.
- (3) Mitosis occurs in geometric progression: 1 cell, 2 cells, 4 cells, 8 cells, 16 cells, etc.
- (4) Cell division takes place more rapidly in bacteria than in other types of cells.
- (5) Cell division occurs when a bacterial cell gets too large to function properly.

8. A distinction is sometimes made between preserving an ecosystem in its natural state and conserving an ecosystem, or managing it to balance the needs of wildlife and the local human population.

When would conservation be more likely to be used than preservation in an ecosystem?

- (1) if humans needed to make a living there
- (2) if there were no local human population
- (3) if the human population were very small
- (4) if the ecosystem were unique
- (5) if the ecosystem were far from human settlements

9. Charles Darwin thought that evolution took place gradually, with tiny changes eventually adding up to major change in a species. If this view is right, then there should be fossils, remains of long-dead organisms, that show the intermediate stages of evolution in a species. However, the fossil record often shows no intermediate forms for long periods of time. Instead, fossils of a species remain the same over a long period, and then suddenly become distinctly different. To account for this, some modern scientists have hypothesized that species evolve during short periods of rapid, major change, separated by long periods of relative stability.

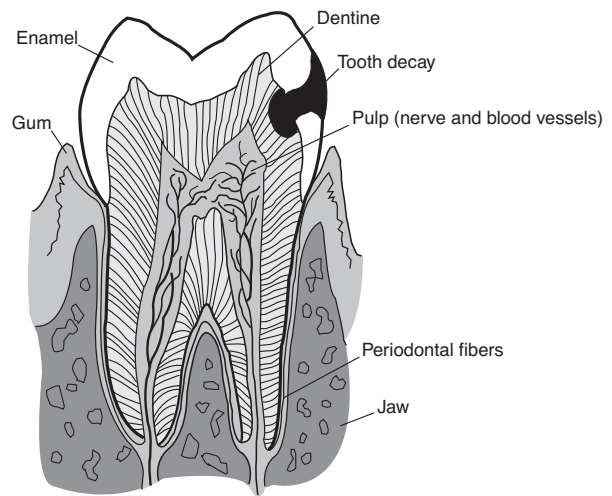
Which of the following hypotheses may also explain why evolutionary change sometimes seems to occur rapidly and dramatically?

- (1) Organisms with soft tissues rarely form fossils.
  - (2) Fossils usually form in layers of sedimentary rock.
  - (3) Genetic change occurs only slowly in most species.
  - (4) The fossil record for any given species may be incomplete.
  - (5) Fossils do not provide evidence for evolution.
10. Blood consists of blood cells and proteins suspended in a yellowish liquid called plasma. Red blood cells carry oxygen to the cells. White blood cells protect the body against infection. Plasma transports nutrients and hormones to the body's cells and removes waste.

What are the main functions of blood?

- (1) hormone and energy production
- (2) energy production and movement
- (3) movement and cell repair
- (4) cell repair and transport
- (5) transport and defense

Questions 11 and 12 refer to the following diagram.



11. Which material covers the tooth's top surface?

- (1) enamel
- (2) decay
- (3) nerve fibers
- (4) blood vessels
- (5) periodontal fibers

12. Tooth decay can eat away at the structure of a tooth. Which part of the tooth must decay reach to cause extreme pain?

- (1) the surface
- (2) the enamel
- (3) the dentine
- (4) the crown
- (5) the pulp

13. The carrying capacity of an ecosystem is the maximum number of organisms it can support. If the carrying capacity is exceeded, there will not be enough resources, and one or more species will decline until a balance of organisms and resources is reached.

Which of the following is an example of people overloading the carrying capacity of an ecosystem?

- (1) using a park for recreation
- (2) grazing too many cattle on grassland
- (3) hiking the length of the Appalachian trail
- (4) adding a room to a suburban house
- (5) banning shellfishing in polluted waters



14. Classification is the grouping of organisms based on similarities in their traits and their evolutionary histories. In the past, scientists classified organisms based primarily on a visual analysis of their structures and on the fossil record. Today, DNA analysis of selected genes is overturning many traditional classifications. For example, it was thought that sperm whales and dolphins, both of which have teeth, were closely related. However, DNA analysis revealed that sperm whales are actually more closely related to baleen whales, which do not have teeth.

What is the reason that DNA analysis has led to changes in the classification of organisms?

- (1) DNA analysis provides more fundamental, accurate data than does a visual analysis of structures and fossils.
- (2) Traditional classification was based on the erroneous assumption that organisms could be grouped by similarities.
- (3) The fossil record is not a reliable source of information about organisms in the past.
- (4) When organisms possess similar structures, it always means that they are closely related.
- (5) When data from DNA analysis conflicts with data from structural analysis, usually the structural data is correct.

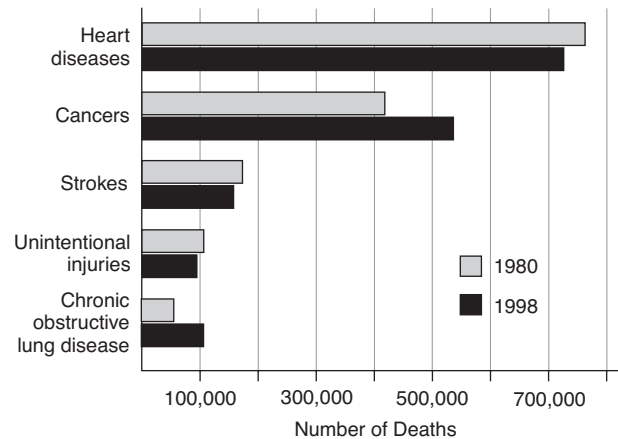
15. Homeothermy refers to the maintenance of a constant body temperature in warm-blooded animals, such as dogs and human beings. Warm-blooded animals have specific body processes that help them gain or lose heat.

Which of the following body processes are involved in homeothermy?

- (1) cell repair and growth
- (2) resting and sleeping
- (3) panting and sweating
- (4) eating and digesting
- (5) mating and reproducing

Question 16 refers to the following graph.

**Leading Causes of Death in the United States, 1980 and 1998**



SOURCE: National Center for Health Statistics

16. For which cause did the number of deaths double between 1980 and 1998?

- (1) heart diseases
- (2) cancer
- (3) strokes
- (4) unintentional injuries
- (5) chronic obstructive lung diseases

17. Ben set up an experiment to prove that ivy plants take in water through their roots. He took a jar, filled it with water, and put an ivy plant in the open jar. After a week, he checked the water level in the jar and found it had gone down. Ben concluded the plant absorbed water through its roots.

Why does Ben have insufficient proof for his conclusion?

- (1) Ben should have put more ivy plants in the open jar.
- (2) Ben should have put several plants of different species in the open jar.
- (3) The water level in the jar might have gone down because of evaporation.
- (4) The water level in the jar might have been misjudged the second time.
- (5) There should have been soil in the jar rather than water.

**Answers and explanations start on page 651.**



# GRAMMAR AND USAGE PRACTICE QUESTIONS

Questions 1 through 5 refer to the following paragraphs.

## Unorthodox Tennis Stars

### (A)

(1) Venus and Serena Williams are not your typical tennis stars. (2) For one thing, they are African Americans in a game that few African Americans have played; those who preceded them were Althea Gibson, Arthur Ashe, and Zina Garrison. (3) For another, Venus and Serena are sisters.

### (B)

(4) Tennis players often receive hours of instruction from highly paid coaches, but it doesn't happen that way for Venus and Serena. (5) Instead, their father, the former owner of a security-services business, taught them how to play on public courts, after teaching himself through books and films. (6) The family lived in a rough neighborhood, and gang members watched over the girls while they practiced.

### (C)

(7) The practice paid off. (8) Venus had won 63 tournaments by the time she turned 12, and she became a professional at 14. (9) In just a few years, she earns millions of dollars in endorsements and prizes. (10) Serena, turning professional a year after Venus, had a slower start. (11) However, experts think she may someday be better than her sister.

### (D)

(12) The two sisters, who live in Palm Beach Gardens, Florida, is best friends. (13) Though they sometimes face each other on the court, there been no trace of sibling rivalry.

1. Sentence 4: **Tennis players often receive hours of instruction from highly paid coaches, but it doesn't happen that way for Venus and Serena.**

Which correction should be made to sentence 4?

- (1) change receive to receives
- (2) replace hours with ours
- (3) remove the comma
- (4) change doesn't to didn't
- (5) no correction is necessary

2. Sentence 6: **The family lived in a rough neighborhood, and gang members watched over the girls while they practiced.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) they
- (2) the girls
- (3) each
- (4) she
- (5) one

3. Sentence 9: **In just a few years, she earns millions of dollars in endorsements and prizes.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) earns
- (2) earned
- (3) be earning
- (4) earn
- (5) will earn

4. Sentence 12: **The two sisters, who live in Palm Beach Gardens, Florida, is best friends.**

Which correction should be made to sentence 12?

- (1) replace two with too
- (2) remove the comma after sisters
- (3) change live to lives
- (4) remove the comma after Florida
- (5) change is to are

5. Sentence 13: **Though they sometimes face each other on the court, there been no trace of sibling rivalry.**

Which correction should be made to sentence 13?

- (1) change face to faced
- (2) remove the comma after court
- (3) replace there with their
- (4) change been to was
- (5) change been to is

---

Questions 6 through 10 refer to the following paragraphs.

### Getting the Best Service for Your Car

#### (A)

(1) Have you had trouble finding a good mechanic? (2) By following these tips, you can improve your chances of getting quality service.

#### (B)

(3) Even before your car breaks down, look for a shop you like and trust. (4) Ask people where they will receive good service at a reasonable price. (5) Don't have picked a shop just because it's close to home, for another shop may have a better deal. (6) Be wary of ads that offer rock-bottom prices. (7) Specials like these often comes with restrictions attached.

#### (C)

(8) Be as specific as possible when you describe your car's problem to the mechanic. (9) If the technician must spend time trying to determine what's wrong, it will cost more. (10) You also need to request information about both estimates and guarantees before the repair work starts. (11) Ask for a price range rather than an exact estimate. (12) Find out how long the guarantee lasts and whether there's any time or mileage limits.

#### (D)

(13) If you don't understand a repair explanation, ask for clarification right away. (14) In addition, keep records of all repairs and billing in case of a dispute.

6. Sentence 4: **Ask people where they will receive good service at a reasonable price.**

Which correction should be made to sentence 4?

- (1) change Ask to Asking
- (2) change Ask to To ask
- (3) change will receive to have received
- (4) change will receive to receiving
- (5) no correction is necessary

7. Sentence 5: **Don't have picked a shop just because it's close to home, for another shop may have a better deal.**

Which correction should be made to sentence 5?

- (1) change have picked to pick
- (2) change have picked to be picking
- (3) replace it's with its
- (4) remove the comma
- (5) change have to be having

8. Sentence 7: **Specials like these often comes with restrictions attached.**

Which correction should be made to sentence 7?

- (1) change Specials to Special
- (2) replace these with this
- (3) insert a comma after these
- (4) change comes to came
- (5) change comes to come

9. Sentence 9: **If the technician must spend time trying to determine what's wrong, it will cost more.**

Which correction should be made to sentence 9?

- (1) change must spend to spent
- (2) change what's to what are
- (3) remove the comma
- (4) replace it with the repair job
- (5) change will cost to costed

10. Sentence 12: **Find out how long the guarantee lasts and whether there's any time or mileage limits.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) there's
- (2) there be
- (3) there are
- (4) there were
- (5) there will have been

Questions 11 through 15 refer to the following letter.

### Taxpayer Notification

#### (A)

(1) We have received your tax return and have noted some inconsistencies in it. (2) We are therefore proposing a number of changes to your return. (3) These changes and its effect on your refund are outlined below.

#### (B)

(4) First, the amount you claimed for self-employed income differs from our records. (5) If you wish to contest this change, please send photocopies of one's records. (6) Second, you have made an error in your calculations. (7) Please review our calculations, which is appended to this letter.

#### (C)

(8) These changes having been made to your return, there is an increase in the amount of taxes you owe. (9) Your refund has therefore been reduced accordingly.

#### (D)

(10) Contact us if you have any questions about these specific problems or about the documents you must send to contest the changes. (11) Be sure to send the last page of this letter when replying by mail. (12) If we determine that your return was correct as filed, we have credited your account.

11. Sentence 3: **These changes and its effect on your refund are outlined below.**

Which correction should be made to sentence 3?

- (1) replace These with Them
- (2) insert a comma after changes
- (3) replace its with their
- (4) insert a comma after refund
- (5) change are to is

12. Sentence 5: **If you wish to contest this change, please send photocopies of one's records.**

Which correction should be made to sentence 5?

- (1) change wish to wishes
- (2) remove the comma
- (3) change send to to to send
- (4) replace one's with your
- (5) no correction is necessary

13. Sentence 7: **Please review our calculations, which is appended to this letter.**

Which correction should be made to sentence 7?

- (1) change review to reviewing
- (2) replace our with are
- (3) remove the comma
- (4) change is to are
- (5) replace to with too

14. Sentence 8: **These changes having been made to your return, there is an increase in the amount of taxes you owe.**

If you rewrote sentence 8 beginning with

Because of these changes to your return, the amount of taxes you owe

the next words should be

- (1) has increased
- (2) have increased
- (3) is increasing
- (4) are increasing
- (5) been increased

15. Sentence 12: **If we determine that your return was correct as filed, we have credited your account.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) have credited
- (2) will credit
- (3) will have credited
- (4) credited
- (5) had credited

Questions 16 through 20 refer to the following paragraphs.

### Disability Etiquette

#### (A)

(1) Many of us doesn't know how to act when meeting someone who has a disability. (2) The main thing to remember is that people with disabilities has feelings just like everyone else. (3) They want to be treated with respect and dignity. (4) Beyond that, try the following tips.

#### (B)

(5) When you meet a person with a disability, speak and act with he or she as you would with anyone else. (6) Use your usual tone of voice. (7) A person who has trouble hearing you will let you know. (8) Don't talk down to the person or stare. (9) Refrain from using a term like *handicap*, which focuses on the disability rather than on the person. (10) Instead, use a term such as *physically challenged* or say, "He uses a wheelchair."

#### (C)

(11) Any assistive equipment, such as a wheelchair, cane, or communication board, is the person's property. (12) Unless you have the person's express permission, you should not touch it. (13) Also, distracting a blind person's guide dog could put the owner in danger, so do not pet it.

#### (D)

(14) Finally, if you have a child with you, don't prevent him or her from talking to the person or asking questions. (15) Children are often more accepting than adults.

16. Sentence 1: **Many of us doesn't know how to act when meeting someone who has a disability.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) doesn't
- (2) don't
- (3) didn't
- (4) never does
- (5) never did

17. Sentence 2: **The main thing to remember is that people with disabilities has feelings just like everyone else.**

Which correction should be made to sentence 2?

- (1) replace main with mane
- (2) add a comma after remember
- (3) change is to are
- (4) change has to have
- (5) no correction is necessary

18. Sentence 5: **When you meet a person with a disability, speak and act with he or she as you would with anyone else.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) he or she
- (2) he or her
- (3) him or her
- (4) him or she
- (5) them

19. Sentence 11: **Any assistive equipment, such as a wheelchair, cane, or communication board, is the person's property.**

Which correction should be made to sentence 11?

- (1) remove the comma after wheelchair
- (2) change is to being
- (3) change is to are
- (4) change person's to persons
- (5) no correction is necessary

20. Sentences 13: **Also, distracting a blind person's guide dog could put the owner in danger, so do not pet it.**

If you rewrote sentence 13 beginning with Also, don't pet a blind person's guide dog because distracting

the next word(s) should be

- (1) a blind person's guide dog
- (2) it
- (3) him
- (4) her
- (5) them

Answers and explanations start on page 634.

## Key Ideas

- In a compound sentence, use a comma before the coordinating conjunction.
- Be careful not to use a comma between two words or phrases joined by *and*.
- Insert a comma after an introductory word, phrase, or clause.

## ON THE GED

*Commas are the only mark of punctuation directly tested on Part I of the GED Language Arts, Writing Test.*

## MECHANICS

# Comma Use

As a general rule, commas indicate where readers would pause in a sentence if they were reading it aloud. Below are specific guidelines for using commas.

### Commas in Compound Sentences

In a compound sentence, place a comma immediately before the coordinating conjunction.

#### EXAMPLES

Some people are insecure about hosting a party, but others are relaxed and confident.

Many hosts have years of practice, and they have some organizational tips.

Watch out, though, for sentences that appear to be compound but are not. Some sentences have one main clause but have a compound subject or a compound predicate. If a sentence does not have two independent clauses, a comma is not needed before the coordinating conjunction.

**Incorrect:** Planning, and list making are two key organizational techniques.

**Correct:** Planning and list making are two key organizational techniques.

**Incorrect:** Making a list reduces disorganization, and helps you feel in control.

**Correct:** Making a list reduces disorganization and helps you feel in control.

### Commas after Introductory Elements

In general, a comma should follow an introductory word, phrase, or clause to separate the introductory element from the main part of the sentence.

#### EXAMPLES

##### Introductory words:

Yes, listing your ideas can be very helpful.

However, making a list is only the first step.

##### Introductory phrases:

Giving it some thought, carefully draw up a guest list.

For a casual feel, have an open house.

On the day of the party, do as much as you can first thing in the morning.

By party time, you should be able to relax.

##### Introductory clauses:

Before you make a list, decide what kind of party you will have.

If you are a good cook, you might choose to have a dinner party.

Remember that only a subordinate clause at the beginning of a sentence requires a comma after it. A subordinate clause at the end of the sentence generally does not.

**No comma:** Decide what kind of party you will have before you make a list.

---

## MECHANICS ► PRACTICE 1.1

**A. Directions:** Insert commas where needed in the sentences below. If no commas are required, write *NC*.

- \_\_\_\_\_ 1. Train travel is more pleasant than riding a bus but it can be more expensive.
- \_\_\_\_\_ 2. When you're on a train you can stand up and stretch if you need to.
- \_\_\_\_\_ 3. Most trains have club cars where passengers can get snacks and sometimes even sit at tables.
- \_\_\_\_\_ 4. Unlike buses trains sometimes have seats that face each other.
- \_\_\_\_\_ 5. Traveling through a scenic area you may find that your train has a double-decker car that offers a better view.
- \_\_\_\_\_ 6. Lowered air fares and many people's unwillingness to spend long hours in a train have contributed to the declining popularity of rail travel.

**B. Questions 7 through 9 refer to the following paragraphs.**

### Low-Fat Cooking

#### (A)

(1) To have a more healthful diet, try cooking with less fat. (2) It's not as hard as you think! (3) For starters use cooking methods that require little or no oil or butter, such as steaming, poaching, or baking. (4) When you do include oil in the preparation of your dish, use less of it. (5) Vinegar can be used without oil in salad dressing, and the flavor can be enhanced with fresh herbs.

#### (B)

(6) Another tactic is to cut down on dairy fat. (7) Avoid regular milk, cream, and sour cream. (8) Add low-fat dairy products or another liquid to your dish instead. (9) Many dairy foods come in a low-fat version, and though not all of them may be pleasing to the palate, some are.

**7. Sentence 3:** For starters use cooking methods that require little or no oil or butter, such as steaming, poaching, or baking.

Which correction should be made to sentence 3?

- (1) insert a comma after starters
- (2) change require to requires
- (3) remove the comma after butter
- (4) remove the comma after steaming
- (5) no correction is necessary

**8. Sentence 5:** Vinegar can be used without oil in salad dressing, and the flavor can be enhanced with fresh herbs.

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) dressing, and
- (2) dressing and
- (3) dressing. And
- (4) dressing, or
- (5) dressing, for example

**9. Sentence 9:** Many dairy foods come in a low-fat version, and though not all of them may be pleasing to the palate, some are.

Which correction should be made to sentence 9?

- (1) change come to comes
- (2) remove the comma after version
- (3) insert a comma after pleasing
- (4) remove the comma after palate
- (5) no correction is necessary

**Answers and explanations start on page 635.**



## Key Ideas

- Separate the items in a series with commas.
- Put commas around an appositive only if it gives nonessential details about a noun.
- Don't put a comma between a subject and a verb.
- Don't use a comma between two items joined by *and* or *or*.

### GED TIP

When an option involves removing a comma, see if you can apply a specific rule for using a comma in that place. If you cannot, the comma should probably be removed.

## Commas in a Series

When three or more items are listed in a series, place commas *between* the items:

### EXAMPLES

Keith, Darnelle, Marisol, and Doug are ready to take the GED Test. They have taken a GED class, studied together, and prepared well.

The comma before the final *and* or *or* is optional (for example, *March 7, March 14, or March 21*). Placing a comma there is not tested on the GED Writing Test, but using one there will help you place commas correctly in the series. To use commas between the items in a series, count the number of items listed and subtract one. That is the number of commas you should use.

## Commas with Appositives

An **appositive** is a word or group of words that gives more information about a noun by renaming it.

### EXAMPLES

Marisol, an experienced writer, feels confident about the GED essay. Doug's cousin, Gina, was the first in the family to receive a GED.

To decide whether to set off an appositive with commas, mentally cross out the appositive. Then ask, "*Can I still identify the person, place, or thing described in the sentence?*" If you can, use commas around the appositive.

### EXAMPLES

Mann College, ~~a local community college~~, offers GED courses. Keith, ~~who attended GED class for a year~~, has done well there.

Here you can identify the noun without the appositive. Each appositive adds more information, but it is not essential to your understanding. Usually when an appositive is renaming a proper noun, it is not essential.

On the other hand, if you cannot identify the person, place, or thing without the appositive, do not set off the appositive with commas.

### EXAMPLES

Keith and his friend ~~Antoine~~ plan to work in construction. Students ~~who study faithfully~~ usually do well on the test.

In these examples, you cannot identify the nouns without the appositives. You would ask, "*Which friend?*" and "*Which students?*" The appositives are essential to your understanding and should not be set off by commas.

## Comma Errors to Avoid

It is easy to overuse commas. Avoid this error by following these guidelines:

Do not use a comma between the subject and the verb.

**Incorrect:** Park College, is the school Doug hopes to attend.

Do not use a comma between two subjects, two verbs, or two other items joined by *and* or *or*.

**Incorrect:** Science, and math are hard subjects for Keith.

**Incorrect:** Darnell writes practice essays, and reads.

**Incorrect:** They will review his application, and transcript.



## MECHANICS ► PRACTICE 1.2

**A. Directions:** Insert commas where needed in the sentences below. If no commas are required, write *NC*.

- \_\_\_\_\_ 1. Kwanzaa is a week-long African American holiday that celebrates culture community and family.
- \_\_\_\_\_ 2. Kwanzaa a wintertime holiday is based on an ancient African harvest celebration.
- \_\_\_\_\_ 3. It was developed in modern times by scholar Maulana Karenga.
- \_\_\_\_\_ 4. Kwanzaa celebrations include rituals such as singing dancing drumming and poetry reading.
- \_\_\_\_\_ 5. The family lights one candle every day for each of seven principles: unity self-determination responsibility cooperative economics purpose creativity and faith.
- \_\_\_\_\_ 6. A day during which people consider their moral worthiness marks the end of Kwanzaa.

**B. Questions 7 through 9 refer to the following paragraphs.**

### Childproofing Your Home

#### (A)

(1) If you have small children, you no doubt appreciate the need to make your home as safe as possible. (2) It is a fact that home accidents, are responsible for more children's injuries than all childhood diseases combined. (3) Taking a few simple measures might reduce the number of times you take your kids to the emergency room.

#### (B)

(4) Start by putting childproof locks on all cupboards in which medicines poisons, or fragile objects are stored. (5) To keep babies and toddlers from entering dangerous areas, put baby gates in doorways and install sleeves on doorknobs. (6) Install safety locks on doors and windows. (7) Make sure that older children, those ten and up can open them in an emergency. (8) To prevent burns in the bathtub, keep the water temperature below 120°F. (9) Cover unused outlets with outlet plugs.

**7. Sentence 2:** It is a fact that home accidents, are responsible for more children's injuries than all childhood diseases combined.

Which correction should be made to sentence 2?

- (1) insert a comma after fact
- (2) remove the comma
- (3) change are to is
- (4) insert a comma after injuries
- (5) no correction is necessary

**8. Sentence 4:** Start by putting childproof locks on all cupboards in which medicines poisons, or fragile objects are stored.

Which correction should be made to sentence 4?

- (1) change Start to Starting
- (2) insert a comma after locks
- (3) insert a comma after medicines
- (4) insert a comma after objects
- (5) change are to is

**9. Sentence 7:** Make sure that older children, those ten and up can open them in an emergency.

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) children, those ten and up
- (2) children those ten and up
- (3) children, those ten, and up,
- (4) children, those ten and up,
- (5) children those ten and up,

**Answers and explanations start on page 635.**

## MECHANICS

## Capitalization

**Key Ideas**

- Capitalize proper nouns and adjectives.
- Capitalize days of the week, months, and names of holidays, but not seasons.
- Capitalize titles if they come before a person's name or are used to address the person.

**GED TIP**

*If you spot a capitalization error as you read a sentence in a GED question, look immediately for the option that corrects it.*

To recognize capitalization errors on Part I of the GED Writing Test and to use capital letters correctly in your essay, follow these guidelines.

Capitalize proper nouns. A **proper noun** is the name of a specific person, place, thing, or idea. If a proper noun has two or more words, capitalize each word.

**EXAMPLES**

Claude Normand is a major contributor to Portland Community Hospital. The hospital is located on Camden Road in Portland, Maine.

The hospital and charities such as the American Cancer Society rely on contributions from citizens.

All major religions, from Islam to Christianity, support giving to charity.

Note that the key words in addresses are proper nouns and are capitalized. The key words include the names of streets, cities, states, and countries.

Do not capitalize common nouns, which do not refer to a specific person, place, or thing.

**EXAMPLE**

**Incorrect:** Many Doctors volunteer at Clinics in the City.

**Correct:** Many doctors volunteer at clinics in the city.

Capitalize the names of proper adjectives. A **proper adjective** is formed from a proper noun.

**EXAMPLE**

Mr. Normand has a French Canadian heritage.

Capitalize a title before a person's name. Do not capitalize a title when it appears without a person's name unless it is used in direct address.

**EXAMPLES**

**Title before name:** Mr. Normand met recently with Dr. Halverson and Mayor Maresky.

**Title without name:** The doctor and mayor were very receptive to his ideas.

**Direct address:** He said, "Thank you, Mayor, for listening to my proposal."

Capitalize names of holidays, days of the week, and months. Do not capitalize the names of seasons.

**EXAMPLES**

Memorial Day is always the last Monday in May and is a paid holiday.

The project will be completed by the end of spring.

Capitalize names of specific school courses and all languages.

**EXAMPLE**

I am taking Introduction to Computers 101, English, and math.

---

## MECHANICS ► PRACTICE 2

A. **Directions:** Correct the capitalization errors in the sentences below.

**EXAMPLE:**

I am writing to thank the <sup>s</sup>Staff of the Waterside Physical Therapy <sup>C</sup>Center.

1. Last Spring, I broke my arm in a car accident.
2. My internist, doctor claudia McNally, referred me to Waterside.
3. The center's Director, Ilana Harris, assigned me a physical therapist named Ellie Royce.
4. Ellie studied physical therapy in her native London and used british methods of treatment that relieved my pain quite effectively.
5. She also did therapy with me in the pool at Rainbow health club.
6. I finished my treatments just before labor day, and I feel 100 percent better, thanks to Ellie.

B. Questions 7 through 9 refer to the following paragraphs.

### An Unusual Breed

(A)

(1) The akita is a Japanese dog breed that dates to ancient times. (2) The breed has a special spiritual meaning for many. (3) For example, when a child is born, well-wishers give the family small statues of akitas to express hopes for future happiness and health. (4) In the past, only Emperors and nobles were allowed to own this breed.

(B)

(5) Akitas are massive, powerful dogs, used for hunting game and guarding. (6) Starting in the 17th century, they were trained to hunt game and waterfowl in the Mountains of Japan. (7) In 1937, akitas were brought to america by author Helen Keller.

7. **Sentence 4:** In the past, only Emperors and nobles were allowed to own this breed.

Which correction should be made to sentence 4?

- (1) remove the comma
- (2) change Emperors to emperors
- (3) change nobles to Nobles
- (4) insert a comma after nobles
- (5) change were to are

8. **Sentence 6:** Starting in the 17th century, they were trained to hunt game and waterfowl in the Mountains of Japan.

Which correction should be made to sentence 6?

- (1) change Starting to Started
- (2) remove the comma
- (3) change Mountains to mountains
- (4) change Japan to japan
- (5) no correction is necessary

9. **Sentence 7:** In 1937, akitas were brought to america by author Helen Keller.

Which correction should be made to sentence 7?

- (1) remove the comma
- (2) change were to been
- (3) change america to America
- (4) change author to Author
- (5) change Helen Keller to helen keller

**Answers and explanations start on page 635.**

### Key Ideas

- Use apostrophes with possessive nouns but not with possessive pronouns.
- Use an apostrophe to replace the missing letters in a contraction.
- To decide whether to use a possessive or contraction, test to see whether the full form of the contraction makes sense in the sentence.

### GED TIP

Contractions are acceptable in informal speech and writing. However, try to avoid them in more formal writing situations, such as the GED essay.

## MECHANICS

### Spelling

#### Possessives and Contractions

Some of the most common spelling errors involve possessives and contractions. Follow these guidelines when spelling these words:

A **possessive** shows ownership. Use apostrophes with possessive nouns. Do not use apostrophes with possessive pronouns.

#### EXAMPLES

**Possessive nouns:** friend's car   Marta's map   the dogs' leashes

**Possessive pronouns:** his, hers, ours, yours, theirs, its

**Correct:** The car's tires are new. The map is hers.

If a noun is singular or if it is plural but does not end in *s*, add an apostrophe + *s* to form the possessive.

**Singular possessive:** cat's   boss's   women's

If a noun is plural and ends in *s*, add an apostrophe after the final *s*.

**Plural possessive:** workers'     ladies'  

A singular possessive often sounds like a plural noun. Use an apostrophe only with the possessive.

**Correct:** My company's benefits (possessive) make it one of the best companies (plural) to work for.

A **contraction** shortens two words by combining the second word with the first and leaving out one or more letters. An apostrophe takes the place of the missing letters. Some contractions combine pronouns with verbs.

#### EXAMPLES

here is → here's   there is → there's   I am → I'm

Other contractions combine verbs with the word not.

#### EXAMPLES

have not → haven't   do not → don't   will not → won't

Be careful to use the apostrophe in place of the missing letter or letters. Notice that the correct position is not necessarily the point at which the two words come together.

**Incorrect:** You do'nt have to come with us tonight. (*do'nt* should be *don't*)

Some possessives and contractions sound the same (*your* and *you're*, *its* and *it's*, *their* and *they're*). To determine whether to use a possessive or a contraction, substitute the two words that make up the contraction. If the substitution makes sense, the contraction is correct. If not, use a possessive.

## MECHANICS ► PRACTICE 3.1

A. **Directions:** Underline the correct word or words to complete each sentence.

**EXAMPLE:** I'm (your, you're) downstairs neighbor, and (I've, Iv'e) been having trouble sleeping lately because of noise late at night.

1. (Theirs, There's) a noise that sounds like the thumping beat of rock music.
2. I (ca'nt, can't) be sure (who's, whose) responsible, but (its, it's) coming from your apartment.
3. My roommates and I have discussed this, and (were, we're) running out of patience.
4. You should talk to your children if the stereo is (theirs, there's).
5. Please be considerate of your neighbors just as we are considerate of (our's, ours).

B. **Questions 6 through 8 refer to the paragraphs that follow.**

### Sales Trainees Wanted

#### (A)

(1) Do you have a warm smile? (2) Do people feel comfortable with you? (3) Do you have a friendly phone manner? (4) Do you have good organizational skills? (5) Are you good at solving problems? (6) If you've answered yes to these questions, we need you're skills at Macro Software.

#### (B)

(7) Macro Software is one of the industry leaders in software distribution. (8) In addition to our chain of stores, were proud to offer a mail order service that was the first of its kind. (9) We pride ourselves on our high-quality products, quick delivery times, and excellent customer service.

#### (C)

(10) We are currently hiring sales trainees for our Miami office. (11) Interested parties should send they're resumes to Jim Burns, Macro Software, 904 Ocean Drive, Miami, Florida.

6. **Sentence 6:** If you've answered yes to these questions, we need you're skills at Macro Software.

Which correction should be made to sentence 6?

- (1) change you've to youve
- (2) insert a comma after yes
- (3) remove the comma
- (4) change need to needs
- (5) replace you're with your

7. **Sentence 8:** In addition to our chain of stores, were proud to offer a mail order service that was the first of its kind.

Which correction should be made to sentence 8?

- (1) replace our with hour
- (2) change were to we're
- (3) insert a comma after service
- (4) replace its with it's
- (5) no correction is necessary

8. **Sentence 11:** Interested parties should send they're resumes to Jim Burns, Macro Software, 904 Ocean Drive, Miami, Florida.

Which correction should be made to sentence 11?

- (1) replace parties with party's
- (2) replace they're with their
- (3) replace resumes with resume's
- (4) change Drive to drive
- (5) no correction is necessary

**Answers and explanations start on page 635.**

## Key Idea

Homonyms are words that sound the same but have different spellings and different meanings.

### ON THE GED

*Possessives, contractions, and homonyms are the only kinds of spelling items that appear on the GED Language Arts, Writing Test. Study the ones that give you problems to improve your score.*

## Homonyms

**Homonyms** are words that sound alike but are spelled differently and have different meanings. The following chart lists homonyms and other commonly confused words that people often misspell.

Word	Meaning	Word in Sentence
accept	to receive willingly	I <u>accept</u> responsibility for my actions.
except	excluding	Everyone went <u>except</u> Molly.
affect	to have an impact	Did the medicine <u>affect</u> you?
effect	a result	The <u>effects</u> will wear off soon.
board	a piece of wood	Nail that <u>board</u> to the other one.
bored	not interested	Rami was <u>bored</u> in wood shop class.
brake	to stop; something that stops	Put your foot on the <u>brake</u> !
break	to shatter in pieces	Be careful, or you'll <u>break</u> your arm.
close	to shut	Please <u>close</u> that bag.
clothes	something to wear	I'm going to return those <u>clothes</u> .
desert	to leave behind	Don't <u>desert</u> a friend in need.
dessert	sweet food served after dinner	They offer <u>dessert</u> to their guests.
fare	money paid by a passenger	The subway <u>fare</u> was just raised.
fair	just, right	A lot of people think it's not <u>fair</u> .
forth	forward	Let's go <u>forth</u> !
fourth	in the 4th position	It is our <u>fourth</u> trip in three days.
grate	to shred	We need to <u>grate</u> some potatoes.
great	fantastic; of large size	It's going to be a <u>great</u> casserole.
hole	opening	There's a <u>hole</u> in the sweater.
whole	entire	Soon the <u>whole</u> thing will fall apart.
know	to understand	I don't <u>know</u> what's wrong with him.
no	opposite of yes	He has <u>no</u> sense.
led	past of the verb <i>lead</i> ; brought	He <u>led</u> the worker to the supply room.
lead	a material in pencils	They gave her some <u>lead</u> pencils.
lessen	to decrease	Will you <u>lessen</u> the sugar in the recipe?
lesson	something you learn; moral	That will teach him a <u>lesson</u> .
male	a boy or man	There are both females and <u>males</u> in the Army.
mail	to send a message through the post office; a message sent	Send the letter through the <u>mail</u> .
passed	went by	Have you <u>passed</u> the post office?
past	opposite of <i>future</i>	Yes, in the <u>past</u> .
peace	opposite of <i>war</i>	When will there be world <u>peace</u> ?
piece	a part	That's only a <u>piece</u> of the problem.
principal	head of a school	The <u>principal</u> has called a meeting.
principle	a guiding rule; a moral	He has no <u>principles</u> .
than	compared with	I used to have more money <u>than</u> you.
then	after that; at that time	<u>Then</u> I spent most of mine.
there	at that place	The car is over <u>there</u> .
their	belonging to them	It is <u>their</u> car.
they're	they are	<u>They're</u> going to sell it.
to	indicates a direction	Go <u>to</u> the grocery store.
too	also, in addition	Sharmaine will go, <u>too</u> .
two	the number 2	Buy me <u>two</u> loaves of bread.



---

## MECHANICS ► PRACTICE 3.2

A. **Directions:** Underline the correct word to complete each sentence.

**EXAMPLE:** The chairman of the (board, bored) has called this meeting.

1. This is our (fourth, forth) meeting on the topic of funding.
2. We don't (no, know) any other sources of funding.
3. The director of the organization brought up this (whole, hole) issue.
4. Next (weak, week), we plan to submit a proposal.
5. We worry that a request for funding may (affect, effect) our nonprofit status.
6. In the (past, passed), we could rely on government funding.

B. Questions 7 through 9 refer to the following paragraphs.

### Equal Pay for Equal Work?

(A)

(1) In 1963, women earned only 59 percent of the wages men earned. (2) In 1997, the figure was still just 74 percent. (3) Women have logged great achievements in the workforce, so why don't they receive fare pay?

(B)

(4) One explanation is that the statistics include older women. (5) In principal, the age gap could account for the wage gap because older women still work in jobs in which attitudes and conditions of the past prevail. (6) In contrast, women under the age of 25 earn about 92 percent of what men earn. (7) However, upon closer examination, this theory falls flat. (8) Women in entry-level jobs have always earned salaries similar to those of their male peers. (9) The problem is that women don't receive the same raises and promotions that men get. (10) The affect is that, as women get older, the gap between men's and women's salaries becomes greater.

7. **Sentence 3:** Women have logged great achievements in the workforce, so why don't they receive fare pay?

Which correction should be made to sentence 3?

- (1) change have to has
- (2) replace great with grate
- (3) change achievements to achievement's
- (4) replace fare with fair
- (5) no correction is necessary

8. **Sentence 5:** In principal, the age gap could account for the wage gap because older women still work in jobs in which attitudes and conditions of the past prevail.

Which correction should be made to sentence 5?

- (1) change principal to principle
- (2) remove the comma after principal
- (3) change work to working
- (4) replace past with passed
- (5) no correction is necessary

9. **Sentence 10:** The affect is that, as women get older, the gap between men's and women's salaries becomes greater.

Which correction should be made to sentence 10?

- (1) replace affect with effect
- (2) replace salaries with salary's
- (3) change becomes to become
- (4) replace greater with grater
- (5) no correction is necessary

**Answers and explanations start on page 635.**



## MECHANICS

# Essay Writing Process: Editing for Correct Mechanics

## Key Ideas

- Editing is the final step in the writing process.
- Check your essay for errors in spelling, capitalization, and punctuation.

The final stage of the writing process is editing. You have already practiced editing your work to make sure that your grammar and usage are correct. Now you also need to check for correct mechanics. Ask yourself:

- Did I use commas where needed? Have I removed unnecessary commas?
- Are proper nouns and adjectives, holidays, and days of the week capitalized? Are titles capitalized where appropriate? Did I capitalize any words that should be lowercase?
- Are possessives and contractions used correctly?
- Are homonyms spelled correctly?
- Are there any other misspelled words?

Read the sample paragraph and think about how you would correct the errors in mechanics. Then read the edited paragraph and explanation that follows.

### SAMPLE PARAGRAPH

(1) Perhaps I am part of a very small minority but I would much rather live in an apartment than a house. (2) For one thing its much more secure. (3) When you live in an apartment, people pass you're front door all the time, which makes it more difficult for thieves to brake in. (4) Also neighbors can sometimes see your windows from their apartments, so they can be on the lookout for Suspicious Activity. (5) Neighbors can also take in your male when you go to florida for the weak. (6) You do'nt feel bad about asking for their help because they live nearby.

### EDITED PARAGRAPH

(1) Perhaps I am part of a very small minority, but I would much rather live in an apartment than a house. (2) For one thing, it's much more secure. (3) When you live in an apartment, people pass your front door all the time, which makes it more difficult for thieves to break in. (4) Also, neighbors can sometimes see your windows from their apartments, so they can be on the lookout for suspicious activity. (5) Neighbors can also take in your mail when you go to Florida for the week. (6) You don't feel bad about asking for their help because they live nearby.

Sentence 1 is a compound sentence, so a comma is required before but. In sentence 2, a comma is needed after the introductory phrase *for one thing*. Also, you can use *it is* in the sentence, so the contraction *it's* is correct. In sentence 3, the door is one you own, so the possessive *your* is needed. Also, *break* should replace *brake*, which refers to stopping a car. In sentence 4, *suspicious activity* is not a proper noun, so it should not be capitalized. In sentence 5, *mail* is the correct word for letters. *Florida* should be capitalized since it is the name of a particular place. *Weak* means *not strong*; *week*, which means *seven days*, is required. Finally, the contraction in sentence 6 should have the apostrophe in place of the missing letter.

### GED TIP

Give yourself about ten minutes to edit your GED essay. Read your essay slowly, as if you were reading it aloud. This slow pace will help you catch more errors.

---

## MECHANICS ► PRACTICE 4

**A. Directions:** Read the paragraphs and correct any errors in spelling, capitalization, or punctuation.

**EXAMPLE:**

Given the choice of a raise or shorter working hours, I would take the shortened schedule. Even though I ~~do~~<sup>don't</sup> have a lot of money, I would welcome a ~~brake~~<sup>break</sup> from my job.

A shorter workday would enable me to accomplish many things that always seem to fall by the wayside. First and most important is spending time with my family. If I had more time, I could be there when my daughter comes home from school. I could help her with her homework, especially for her Spanish class because that's my native language. Perhaps she would spend less time watching television. I would also like to spend more time with my husband. He works a different shift than I do and we got trouble coordinating our schedules. If I had a less demanding work schedule we'd see each other more.

Second, there are many errands that never seem to get done. For instance it's hard for us to pay bills on time. Once our phone was even cut off! If our lives weren't so busy, we would sit down and take care of our bills, when they came in.

Finally, I would continue my education. I dropped out of school at 16, and never got my High School Diploma. I was bored and had trouble paying attention. Now that I see the negative affects of not having finished school, I want to get my GED certificate.

**B. Directions:** Edit the essay that you wrote on the following topic:

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Be sure to check for:

- Correct use of commas
- Correct capitalization
- Correct use of possessives and contractions
- Spelling errors, including homonyms

**Answers and explanations start on page 636.**

# MECHANICS PRACTICE QUESTIONS

Questions 1 through 5 refer to the following paragraphs.

## Single Parents and Relationships

### (A)

(1) Children of single parents don't exactly cheer their parents on at the start of a new relationship. (2) Instead, children may have tantrums erase phone messages, and generally try to ruin their parents' chances. (3) If you are a parent in this situation, you need to understand, and show your children that you love them. (4) However, also let your kids know that you feel you're doing the right thing.

### (B)

(5) Your children may become quickly attached to a new date, even within the course of an evening. (6) Alternatively, they may fear that you plan to marry each potential partner you bring home. (7) For these reasons, it makes sense not to introduce all your dates to your children. (8) Try to see your dates at times when your children are'nt at home.

### (C)

(9) Once you become committed to a particular person, it's important to include your partner in family events gradually. (10) Don't be surprised if your children have a negative reaction to your new partner. (11) This time may be difficult for your kids. (12) They're not used to seeing you with a new partner, and they may be realizing that a reconciliation with your ex-spouse is impossible. (13) If communication breaks down consider family counseling. (14) Children may be more willing to share their worries and complaints in that setting.

1. Sentence 2: **Instead, children may have tantrums erase phone messages, and generally try to ruin their parents' chances.**

Which correction should be made to sentence 2?

- (1) remove the comma after Instead
- (2) insert a comma after tantrums
- (3) change try to be trying
- (4) change their to they're
- (5) no correction is necessary

2. Sentence 3: **If you are a parent in this situation, you need to understand, and show your children that you love them.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) understand, and show
- (2) understand. And show
- (3) understand and show
- (4) understand, and you show
- (5) understand show

3. Sentence 4: **However, also let your kids know that you feel you're doing the right thing.**

Which correction should be made to sentence 4?

- (1) remove the comma after However
- (2) replace your with you're
- (3) replace you're with your
- (4) replace right with write
- (5) no correction is necessary

4. Sentence 8: **Try to see your dates at times when your children are'nt at home.**

Which correction should be made to sentence 8?

- (1) change Try to Trying
- (2) replace your with you're
- (3) insert a comma after times
- (4) change are'nt to aren't
- (5) no correction is necessary

5. Sentence 13: **If communication breaks down consider family counseling.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) down consider
- (2) down, consider
- (3) down. Consider
- (4) down, considering
- (5) down, and consider

---

Questions 6 through 10 refer to the following paragraphs.

### The History of Daylight Saving Time

#### (A)

(1) We set our clocks forward every spring and back every fall, but few of us stop to think about why we do this. (2) One of the main reasons for daylight saving time, is to save energy. (3) In the evening, we use lights, TVs, and electrical appliances. (4) Daylight saving time makes the period between sunset and bedtime one hour shorter, and therefore less electricity is used.

#### (B)

(5) With daylight saving time, each time zone changes it's standard time by an hour. (6) Time zones were introduced by the railroads to make schedules standard across the country. (7) In 1918, congress passed a law making the rail time zones official. (8) That same year, a second law put the country on daylight saving time for the rest of World War I. (9) The law was unpopular, however, and it was repealed seven months later. (10) Daylight saving time was also in force during most of World War II.

#### (C)

(11) From 1945 to 1966, each state and town could decide whether to observe daylight saving time. (12) The resulting inconsistencies created a great deal of confusion. (13) For example radio and TV stations had to put out new schedules every time a state started or ended daylight saving time. (14) Then came the Uniform Time Act of 1966, which established starting and ending dates for daylight saving time, in the spring and fall. (15) This law was amended in 1986, when the starting date was moved almost a month earlier to save energy.

6. Sentence 2: **One of the main reasons for daylight saving time, is to save energy.**

Which correction should be made to sentence 2?

- (1) replace main with mane
- (2) insert a comma after reasons
- (3) remove the comma
- (4) change is to are
- (5) no correction is necessary

7. Sentence 5: **With daylight saving time, each time zone changes it's standard time by an hour.**

Which correction should be made to sentence 5?

- (1) remove the comma
- (2) change changes to changed
- (3) replace it's with its
- (4) replace hour with our
- (5) no correction is necessary

8. Sentence 7: **In 1918, congress passed a law making the rail time zones official.**

Which correction should be made to sentence 7?

- (1) remove the comma
- (2) change congress to Congress
- (3) replace passed with past
- (4) insert a comma after law
- (5) no correction is necessary

9. Sentence 13: **For example radio and TV stations had to put out new schedules every time a state started or ended daylight saving time.**

Which correction should be made to sentence 13?

- (1) insert a comma after example
- (2) change had to have
- (3) change schedules to schedule's
- (4) insert a comma after schedules
- (5) insert a comma after started

10. Sentence 14: **Then came the Uniform Time Act of 1966, which established starting and ending dates for daylight saving time, in the spring and fall.**

Which correction should be made to sentence 14?

- (1) replace Then with Than
- (2) change Act to act
- (3) replace dates with date's
- (4) remove the comma after time
- (5) change spring and fall to Spring and Fall

---

Questions 11 through 15 refer to the following paragraphs.

### Rules and Regulations

#### (A)

(1) Thank you for joining Spring Valley Community center. (2) Before using our facility, please read these rules and regulations carefully.

#### (B)

(3) Please have your membership card with you at all times when your in the building. (4) When you enter the pool or exercise room, a security guard will request to see your card and will deny you entrance without it.

#### (C)

(5) Guests are welcome to use the pool and exercise room, but only when accompanied by members. (6) The guest fee is \$10 per day. (7) When bringing guests, please have them sign in at the desk in the lobby. (8) They will be given a guest card for the day.

#### (D)

(9) Pool safety is very important. (10) If you are a week swimmer, life jackets and other flotation devices are available for your use. (11) Do not hesitate to ask lifeguards for help. (12) Children under the age of 12 must swim in the children's pool unless they're supervised by an adult. (13) Swimming classes are available to help both children and adults improve their skills.

#### (E)

(14) You must register, and pay for any class you wish to take. (15) Members receive a significant discount. (16) Registration may be limited to a certain number of participants.

11. Sentence 1: **Thank you for joining Spring Valley Community center.**

Which correction should be made to sentence 1?

- (1) insert a comma after you
- (2) replace for with four
- (3) change Community to community
- (4) change center to Center
- (5) no correction is necessary

12. Sentence 3: **Please have your membership card with you at all times when your in the building.**

Which correction should be made to sentence 3?

- (1) insert a comma after Please
- (2) replace have your with when you're
- (3) replace times with times'
- (4) insert a comma after times
- (5) replace when your with when you're

13. Sentence 10: **If you are a week swimmer, life jackets and other flotation devices are available for your use.**

Which correction should be made to sentence 10?

- (1) replace week with weak
- (2) remove the comma
- (3) change are to is
- (4) insert a comma after available
- (5) no correction is necessary

14. Sentence 12: **Children under the age of 12 must swim in the children's pool unless they're supervised by an adult.**

Which correction should be made to sentence 12?

- (1) insert commas after Children and 12
- (2) change children's with childrens'
- (3) replace they're with their
- (4) replace they're with there
- (5) no correction is necessary

15. Sentence 14: **You must register, and pay for any class you wish to take.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) register, and pay
- (2) register and pay
- (3) register. And pay
- (4) register. Pay
- (5) register, paying



---

Questions 16 through 20 refer to the following paragraphs.

### Racial Profiling

#### (A)

(1) African American and Hispanic motorists are much more likely to be stopped by police than their white counterparts, often for no apparent reason. (2) What's their offense? (3) African Americans have a name for it: DWB, or Driving While Black.

#### (B)

(4) Blacks and Hispanics, who some police officers believe are more likely to commit crimes, have been systematically targeted by police. (5) Police statistics from 23 states show that this policy, called racial profiling occurs in every geographic location. (6) Motorists, pedestrians, and airline passengers have been searched. (7) The police do not make class distinctions for nonwhites of every station in life have been victims of this practice.

#### (C)

(8) The statistical evidence shows a clear pattern. (9) On one Maryland highway, 73 percent of those stopped by police were African American, even though blacks represented only 17 percent of all drivers. (10) Hispanics make up only 8 percent of the population in Illinois, yet 30 percent of drivers stopped there are Hispanic. (11) However, police superintendents chiefs of police, and other law enforcement officials dispute the studies that document racial profiling. (12) They maintain that the problem has been confined to a small number of officers and can be remedied easily.

16. Sentence 1: **African American and Hispanic motorists are much more likely to be stopped by police than their white counterparts, often for no apparent reason.**

Which correction should be made to sentence 1?

- (1) change motorists to Motorists
- (2) change are to were
- (3) insert a comma after then
- (4) replace then with than
- (5) replace for with four

17. Sentence 5: **Police statistics from 23 states show that this policy, called racial profiling occurs in every geographic location.**

Which correction should be made to sentence 5?

- (1) change states to States
- (2) insert a comma after states
- (3) insert a comma after profiling
- (4) change geographic to Geographic
- (5) no correction is necessary

18. Sentence 7: **The police do not make class distinctions for nonwhites of every station in life have been victims of this practice.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) distinctions for nonwhites
- (2) distinctions, for nonwhites
- (3) distinctions moreover nonwhites
- (4) distinctions, for, nonwhites
- (5) distinctions nonwhites

19. Sentence 10: **Hispanics make up only 8 percent of the population in Illinois, yet 30 percent of drivers stopped there are Hispanic.**

Which correction should be made to sentence 10?

- (1) change make to makes
- (2) change Illinois to Illinoiis
- (3) remove the comma
- (4) replace yet with and
- (5) insert a comma after stopped

20. Sentence 11: **However, police superintendents chiefs of police, and other law enforcement officials dispute the studies that document racial profiling.**

Which correction should be made to sentence 11?

- (1) remove the comma after However
- (2) insert a comma after superintendents
- (3) insert a comma after officials
- (4) change studies to studies'
- (5) no correction is necessary

**Answers and explanations start on page 636.**

# Language Arts, Writing

The GED Language Arts, Writing Test consists of two parts. Part I uses multiple choice questions to assess your knowledge of the conventions of written English. Part II requires you to write an essay. The scores for Parts I and II will be combined and reported to you as a single score. You will have a total of two hours for the test.

## Part I: 50 questions, 1 hour 15 minutes

On Part I, you will read 6 to 9 documents that are 12 to 22 sentences long. You will answer multiple choice questions about each document.

## Part II: 1 essay, 45 minutes

The test directions tell you to plan, make notes, write, revise, and edit an essay on an assigned topic. It is recommended that you take 45 minutes for your essay. If you have time left, you can go back to work on Part I.

### Part I: Content Areas

**Organization (15 percent)** These questions focus on the clarity with which ideas are presented and organized. Organization items ask about choosing effective topic sentences, paragraphing, moving sentences to improve the order of ideas, removing irrelevant sentences, and using transitions. You can review and practice these skills on pages 66–73 and 80–83.

**Sentence Structure (30 percent)** These questions will test your ability to recognize and correct errors in sentence structure. Topics include correcting sentence fragments, comma splices, and run-on sentences; combining ideas effectively; correctly placing modifying words or phrases; and making sure that parallel parts of a sentence are consistent. You can review and practice these skills on pages 84–97 and 102–105.

**Usage (30 percent)** These questions ask about the rules governing our use of the English language. Topics include choosing correct verb forms and tenses, making subjects and verbs agree, and correcting common errors in pronoun use. You can review and practice these skills on pages 106–117 and 120–123.

**Mechanics (25 percent)** Mechanics questions focus on correcting errors in punctuation, capitalization, and spelling. Most of the punctuation questions concern comma use and misuse. Capitalization items apply rules for capitalizing and for avoiding unnecessary capitalization. Spelling questions focus on possessives, contractions, homonyms, and commonly confused words. You can review and practice these skills on pages 124–133 and 136–139.



## GED TIP

*Don't rush to answer the questions on the writing test. You will have time to read each document carefully, from beginning to end. As you do, think about the corrections or improvements that could be made.*

## Part I: Multiple Choice

### Three Types of Documents

You will read and answer questions about three types of documents:

- **How-to** documents such as instructions and directions
- **Workplace** documents such as business letters and memos
- **Informational** documents such as mailings on tourist destinations or analyses of public transit needs

Read each document before you answer the questions that follow it. As you read, look for errors and other problems, as if you were going to fix them. That way, you will be able to predict many of the questions that follow. You will also be better able to answer questions that ask you to look at the piece as a whole. For example, for some questions you must consider the organization of the piece, such as where you should divide one long paragraph, or the relevance of a detail, such as which sentence could be deleted.

### Three Types of Questions

Read the document below. Then choose answers to the questions that follow.

#### GETTING STARTED WITH EXERCISE

(1) Sooner or later, we all realize that we are not getting any younger. (2) At that point, many of us decide too start an exercise program. (3) For an exercise program to be effective, you need to spend at least 20 minutes, 3 times a week. (4) If you decide to exercise regularly, you should first check with your doctor. (5) Your doctor will tell you what type of exercise is best for you.

### Correction Questions

These questions require you to identify an error in a sentence and the best way to fix it. But be aware: some sentences will not contain any errors. For these questions, choose option (5)—no correction is necessary (or no revision is necessary).

**Example Sentence 2:** At that point, many of us decide too start an exercise program.

Which correction should be made to sentence 2?

- (1) remove the comma after point
- (2) insert we after us
- (3) change decide to decides
- (4) replace too with to
- (5) no correction is necessary

**Answer: (4) replace too with to** This spelling correction replaces one word with the correct homonym.

*Remember that not all sentences on the GED have errors. If a sentence is correct as written, you will be given the option “no correction is necessary” or “no revision is necessary,” or you will be able to choose an option that is identical to the original.*

## Revision Questions

A revision question shows you an underlined portion of a sentence or sentences and asks you to choose the best revision for it. The first option will always be the same as the underlined words. If the sentence is correct as written, you should choose option (1).

**Example Sentence 3:** For an exercise program to be effective, you need to spend at least 20 minutes, 3 times a week.

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) effective, you
- (2) effective you
- (3) effective. You
- (4) effective, and you
- (5) effective, so you

**Answer: (1) effective, you** The sentence is correct as written. The other options incorrectly punctuate the sentence or add an unnecessary connecting word.

## Construction Shift Questions

These items ask you to recognize writing that may not be technically incorrect, but it is wordy or awkward. When you read the sentence or pair of sentences, you need to think about how you could rewrite to improve them.

**Example Sentences 4 and 5:** If you decide to exercise regularly, you should first check with your doctor. Your doctor will tell you what type of exercise is best for you.

The most effective combination of sentences 4 and 5 would include which group of words?

- (1) If you ever do decide whether or not to,
- (2) When you are deciding
- (3) At the time at which you decide,
- (4) doctor, who will tell you
- (5) doctor, and then he or she will

**Answer: (4) doctor, who will tell you** Option (4) smoothly combines the two sentences to eliminate the repeated phrase *your doctor*. The new sentence would read as follows: *If you decide to exercise regularly, you should first check with your doctor, who will tell you what type of exercise is best for you.* The other options would not solve the problem of repetition or would create an even more awkward sentence.

## GED TIP

*The best way to write an effective GED essay is to follow a strategy that uses the 45 minutes to plan, write, edit, and revise. You can devise this kind of strategy later in this writing section.*

## ON THE GED

*There is no “right” answer to a GED essay topic question. The essay scorers are looking to see only if you can support your answer with logical, well-written statements.*

*The essay scorers are trained to expect that your work is a draft written under the pressure of a test. They are not expecting it to be perfect.*

## Part II: The Essay

You will have 45 minutes to write an essay on an assigned topic. The directions encourage you to plan, make notes, draft, revise, and edit your essay. Once you practice writing on the essay topics in this book, you will see that 45 minutes is enough time to plan, write, and edit a well-developed essay of about 250 words.

### Essay Topic

You will be given a topic, sometimes called a “prompt,” to write about. The topic will be one that you can write about by drawing on your general life experience and observations. Specialized knowledge will not be needed. The essay will ask you to give your opinion or an explanation.

Below is a sample GED essay prompt:

#### TOPIC

Many people vote in every election. Other people don't vote at all. Do you think that it is important to vote? Why or why not?

In your essay, explain the reasons for your opinion.

### Holistic Scoring

Two readers will read your essay; each will assign it a score from 1 to 4. The average of the two scores is combined, through a formula, with your score from Part I.

The essay readers won't take out a red pen and mark mistakes. Rather, each will read the essay once, fairly quickly, to get an impression of your work as a whole. This method of evaluating is called “holistic” scoring. The essay readers will ask themselves the following questions about your paper:

- Is there a clearly focused main idea?
- Does the main idea of the essay address the assigned topic?
- Is the essay clear and logically organized?
- Is the word choice appropriate and effective?
- Does the essay basically contain correct sentence structure, grammar, and mechanics?

Your essay score will reflect one of the general categories shown below:

Level 4—effective

Level 3—adequate

Level 2—marginal

Level 1—inadequate

If your essay receives an average score of less than 2, you will not receive any score for the Language Arts; Writing Test, even if you performed well on Part I.

## The Standards for Your Essay Score

Below is a copy of the scoring guidelines that the essay readers will use when they review your paper: Read the guidelines over carefully, and come back to them to evaluate the essays that you write as you work through this book.

GED Essay Scoring Guide

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	<b>Inadequate</b>	<b>Marginal</b>	<b>Adequate</b>	<b>Effective</b>
	<b>Reader has difficulty identifying or following the writer's ideas</b>	<b>Reader occasionally has difficulty understanding or following the writer's ideas</b>	<b>Reader understands writer's ideas</b>	<b>Reader understands and easily follows the writer's expression of ideas</b>
<b>Response to the Prompt</b>	Attempts to address prompt but with little or no success in establishing a focus	Addresses the prompt, though the focus may shift	Uses the writing prompt to establish a main idea	Presents a clearly focused main idea that addresses the prompt
<b>Organization</b>	Fails to organize ideas	Shows some evidence of an organizational plan	Uses an identifiable organizational plan	Establishes a clear and logical organization
<b>Development and Details</b>	Demonstrates little or no development; usually lacks details or examples or presents irrelevant information	Has some development but lacks specific details; may be limited to listing, repetitions, or generalizations	Has focused but occasionally uneven development; incorporates some specific detail	Achieves coherent development with specific and relevant details and examples
<b>Conventions of Edited American English (EAE)</b>	Exhibits minimal or no control of sentence structure and the conventions of EAE	Demonstrates inconsistent control of sentence structure and the conventions of EAE	Generally controls sentence structure and the conventions of EAE	Consistently controls sentence structure and the conventions of EAE
<b>Word Choice</b>	Exhibits weak and/or inappropriate words	Exhibits a narrow range of word choice, often including inappropriate selections	Exhibits appropriate word choice	Exhibits varied and precise word choice

Reprinted with permission of the GED Testing Service of The American Council on Education.

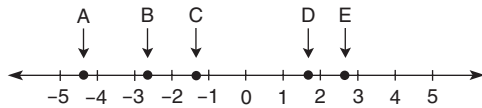
# GED MATH PRETEST

## PART I

Mark your answers on the answer sheet provided at the bottom on page 43. You may use the formulas on page 688 of this book on this test.

**Directions:** Choose the one best answer to each question. You MAY use your calculator.

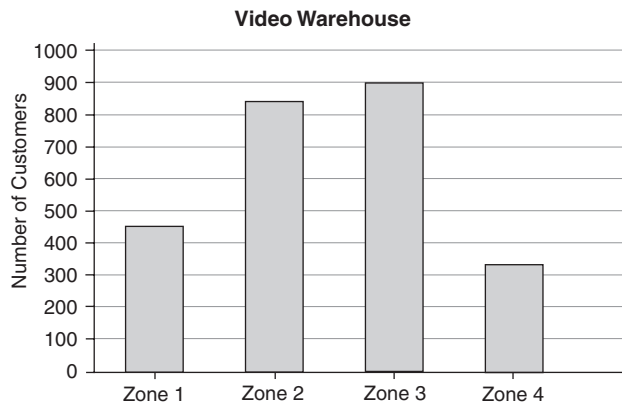
1. Which point on the number line shown below represents the value  $-\frac{16}{6}$ ?



- (1) A
- (2) B
- (3) C
- (4) D
- (5) E

Questions 2 and 3 refer to the following graph.

Video Warehouse has divided the surrounding community into four advertising zones. The graph shows the total number of customers from each zone for a three-week period.



2. During the three weeks, about how many customers came from Zones 3 and 4?

- (1) between 800 and 900
- (2) between 900 and 1000
- (3) between 1000 and 1100
- (4) between 1100 and 1200
- (5) between 1200 and 1300

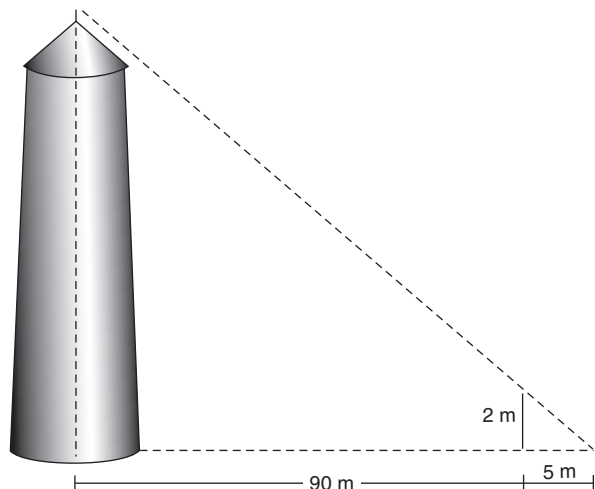
3. Approximately what is the ratio of customers from Zone 1 to customers from Zone 3?

- (1) 5:3
- (2) 3:5
- (3) 3:2
- (4) 2:1
- (5) 1:2

4. Evaluate the expression  $2x - (4y - 3) + 5xz$ , when  $x = -3$ ,  $y = 2$ , and  $z = -1$ ?

- (1) 45
- (2) 16
- (3) 4
- (4) -10
- (5) -22

Question 5 refers to the following drawing.



5. To find the height of a tower, a surveyor places a 2-meter pole in the ground so that it is parallel to the tower. Then she finds the point on the ground from which she can sight the top of the tower and the top of the pole. Using the measurements from the diagram, what is the height of the tower in meters?

Mark your answer in the circles in the grid on your answer sheet on page 43.

6. A parallelogram has two obtuse angles and two acute angles. If the measure of one of the obtuse angles is  $110^\circ$ , what is the measure, in degrees, of one of the acute angles?

Mark your answer in the circles in the grid on your answer sheet on page 43.

Questions 7 and 8 refer to the following information.

Designer Furnishings sells premade cabinets and cupboards. The following cabinets are currently discounted from 10% to 40%.

Model	Dimensions (in inches)	Original Price	Discount
411R	32 by 22 by 10	\$ 90.00	25%
412R	28 by 36 by 15	\$120.00	25%
413S	24 by 72 by 18	\$150.00	40%
414S	25 by 24 by 6	\$ 80.00	10%

7. Each face of cabinet 413S is in the shape of a rectangle. What is the volume of Model 413S in cubic feet?

- (1) 18  
 (2) 31  
 (3) 36  
 (4) 108  
 (5) 216

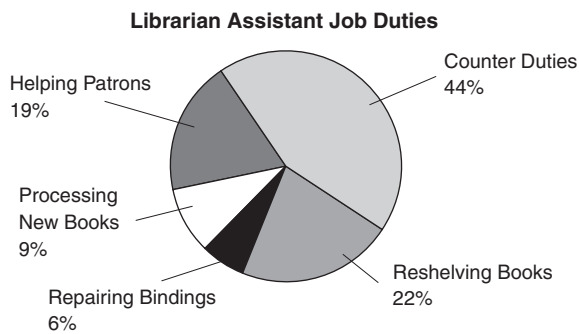
8. Sharon wants to buy two cabinets, Models 411R and 412R. What is the total sale price of the two cabinets?

- (1) \$52.50  
 (2) \$105.00  
 (3) \$157.50  
 (4) \$160.00  
 (5) \$210.00

9. A potter uses  $\frac{3}{5}$  pound of clay in making a bowl. How many bowls could the potter make from 10 pounds of clay?

- (1) 6
- (2) 8
- (3) 13
- (4) 16
- (5) 17

10. Janelle has recently been hired for the job of library assistant. The following graph shows what percent of her time will be spent in each of five tasks each day.



The number of hours that Janelle will spend working at the counter is about how many times the number of hours that she will spend processing new books and repairing bindings?

- (1) 2
- (2) 3
- (3) 4
- (4) 5
- (5) 6

11. Together, Levy and Matthew earn \$4680 per month. Levy earns \$520 more per month than Matthew earns. How much does Levy earn per month?

- (1) \$2080
- (2) \$2600
- (3) \$3120
- (4) \$3640
- (5) \$4160



**Example 2:** Find the difference between 15,789 and 9,332.

1. Always clear a calculator before starting a new computation.
2. Enter the greater number first, followed by the minus sign.
3. Enter the number being subtracted.
4. Press the equals key to find the total.

**AC**

15789 **-**

9332

**=** **6457**

The answer **6457** will appear in the display.

**Example 3:** Find the product of 309 and 68.

1. Always clear a calculator before starting a new computation.
2. Enter the first number, followed by the multiplication sign.
3. Enter the next number.
4. Press the equals key to find the product.

**AC**

309 **×**

68

**=** **21012**

The answer **21012** will appear in the display.

**Example 4:** Divide 12,456 by 12.

1. Always clear a calculator before starting a new computation.
2. Always enter the number to be divided first.
3. Enter the division sign and the number you are dividing by.
4. Press the equals key to find the quotient.

**AC**

12456

**÷** 12

**=** **1038**

The answer **1038** will appear in the display.

---

## WHOLE NUMBER ► PRACTICE 4.1

**A. Practice solving the following problems on your calculator.**

- |                             |                         |                       |
|-----------------------------|-------------------------|-----------------------|
| 1. $19 + 26 + 85 + 23 =$    | 4. $2568 \div 107 =$    | 7. $209 \times 56 =$  |
| 2. $2579 - 1392 =$          | 5. $12,356 + 14,728 =$  | 8. $972 \div 18 =$    |
| 3. $4 \times 28 \times 7 =$ | 6. $107,899 - 93,457 =$ | 9. $20,540 \div 13 =$ |

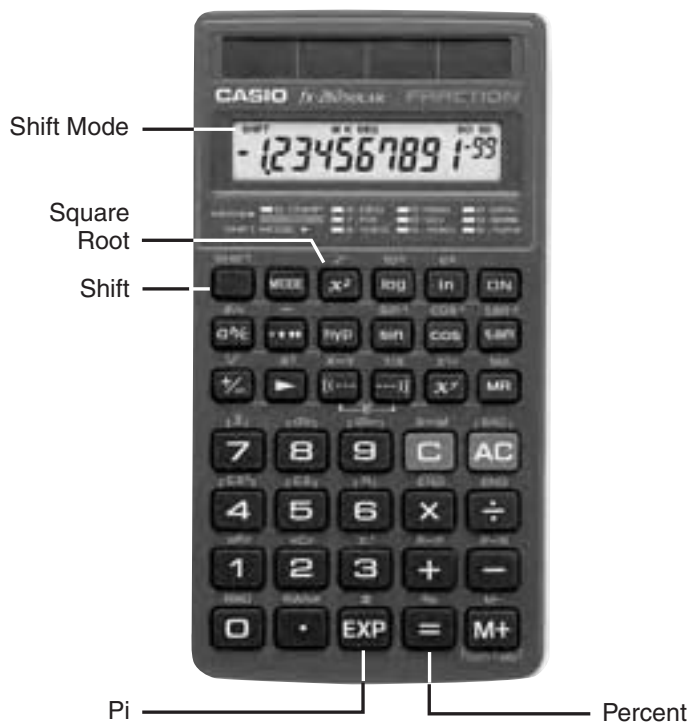
**B. Choose the one correct answer to each question.**

- |   |   |
|---|---|
| <b>10.</b> Dan bought a used car with 16,741 miles on it. If the car now has 42,920 miles on it, how many miles has Dan put on the car?<br>(1) 16,741<br>(2) 26,179<br>(3) 41,246<br>(4) 42,920<br>(5) 59,661 | <b>11.</b> A shipment of 20 computers arrived at a warehouse. If each computer is valued at \$995, what is the total value of the shipment?<br>(1) \$995<br>(2) \$1,015<br>(3) \$1,990<br>(4) \$1,900<br>(5) \$19,900 |
|---|---|

**Answers and explanations begin on page 664.**

## Second Function Keys

To access some of the keys on the *Casio fx-260*, you need to press the shift key in the upper left corner of the keypad. This will activate the function shown in yellow above the corresponding key. Highlighted below are the second function keys that you will be most likely to use on the GED Math Test. If you do not currently have the *Casio fx-260*, find out how your calculator finds square roots and percents.



SOURCE: Courtesy of Casio, Inc.

**Example 5:** Find the square root of 169.

1. Always clear a calculator before starting a new computation.
2. Enter the number you want to find the square root of.
3. Press the shift key. Note that the word *SHIFT* now appears in the upper left of the display.
4. Press the  $x^2$  key, which activates the square root key shown in yellow above the  $x^2$  key on the calculator.

AC

169

SHIFT

$\sqrt{\quad}$

The answer 13 will appear in the display.

Notice that it was not necessary to press the equals key after the square root key. For more information about square roots, see page 458.

### Points to remember:

- Use the shift key to help you find square roots and percents on the *Casio fx-260* calculator.
- If you do not have the *Casio fx-260*, see how your calculator finds square roots and percents.
- Always clear the display before beginning a new problem.

**Example 6:** Find the part if you are given the percent and the whole. Find 10 percent of 500.

1. Always clear a calculator before starting a new computation. AC
2. Enter the number you want to find the percent of. 500
3. Press the multiplication sign. ×
4. Enter the percent number. 10
5. Press the shift key, and then press the equals key, which activates the percent key. SHIFT %

The answer **50** will appear in the display. Ten percent of 500 is 50.

**Example 7:** Find the percent if you are given the whole and the part. What percent of 240 is 60?

1. Always clear a calculator before starting a new computation. AC
2. Enter the part. 60
3. Press the division sign. ÷
4. Enter the whole. 240
5. Press the shift key, and then press the equals key, which activates the percent key. SHIFT %

The answer **25** will appear in the display. 60 is 25 percent of 240.

For more information about percents, see pages 390–411 .

---

## WHOLE NUMBER ► PRACTICE 4.2

**A. Practice solving the following problems on your calculator.**

1.  $\sqrt{625} =$
2.  $\sqrt{324} =$
3.  $\sqrt{1225} =$
4. Find 20% of 680.
5. Find 10% of 1250.
6. 15 is what percent of 300?
7. Find 5% of 40.
8. Find 30% of 450.
9. 20 is what percent of 400?

**B. Choose the one best answer to each question.**

10. Tanya paid 20% of \$1680 as a down payment. How much was the down payment?  
(1) \$20  
(2) \$32  
(3) \$168  
(4) \$336  
(5) \$840
11. Aaron received a credit of \$48 in interest on \$960. What percent of \$960 is \$48?  
(1) 5%  
(2) 20%  
(3) 48%  
(4) 912%  
(5) 2000%

**Answers and explanations begin on page 664.**

## WHOLE NUMBER ► PRACTICE 5

1. A veterinary clinic treated 435 cats over a 3-month period. At this rate, how many cats will the clinic treat in a 12-month period?

Mark your answer in the circles in the grid.

2. A quick oil change shop recommends changing a car's oil and filter every 3,500 miles. If a car is driven 35,000 miles, how many times should the oil and filter have been changed?

Mark your answer in the circles in the grid.

3. Attendance at a local play was 348 Friday night, 366 Saturday night, and 280 Sunday afternoon. What was the total attendance for the 3 days?

Mark your answer in the circles in the grid.

4. A restaurant sells cookies 3 for \$1. How many cookies could you buy for \$5?

Mark your answer in the circles in the grid.

5. How many sheets of paper would 4 copies of a 617-page document use?

Mark your answer in the circles in the grid.

6. How many months would it take to pay back \$1050 at \$50 per month?

Mark your answer in the circles in the grid.

1.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

2.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

3.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

4.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

5.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

6.

.	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Answers and explanations begin on page 664.

## MATH BASICS

Problem Solving:  
Set-Up Problems**Key Ideas**

- Always apply the order of operations when finding a solution.
- Use this order:
  - Grouping symbols
  - Multiplication and division
  - Addition and subtraction
- Use your knowledge of formulas to recognize different variations of the same formula.

**GED TIP**

*If at first you don't see your answer in the options provided, try rewriting your answer until it matches one of the set-up solutions provided.*

**Order of Operations**

A set of rules called the **order of operations** exists to ensure that there is only one correct answer when more than one operation is used in a math solution. Perform operations in the order in which they are listed below, working from left to right.

## Order of Operations

Step 1. Perform any operations within grouping symbols such as parentheses OR over or under a fraction (division) bar.

Step 2. Perform multiplication or division, working from left to right.

Step 3. Perform addition or subtraction, working from left to right.

**Example 1:** Solve  $3 + 4 \times 2$ .

1. Since there are no grouping symbols, perform any multiplication or division first.  $3 + 4 \times 2$
2. Perform any addition or subtraction.  $3 + 8 = 11$

**Example 2:** Solve  $(3 + 4) \times 2$ .

1. Perform any operations within parentheses.  $(3 + 4) \times 2$
2. Perform any multiplication or division.  $7 \times 2 = 14$

**Example 3:** Solve  $\frac{4 \times 5}{2(4 + 1)}$ .

1. Perform any operations within parentheses.  $\frac{4 \times 5}{2(4 + 1)}$
2. Perform any multiplication or division above and below the fraction, or division, bar.  $\frac{4 \times 5}{2(5)}$
3. Think of the fraction bar as a division sign. Divide the top number (20) by the bottom number (10).  $\frac{20}{10} = 2$

**Set-Up Problems**

Knowing and recognizing how to solve a problem is important to your success on the GED Math Test. You will encounter questions that ask you to choose the option that shows the correct way to solve the problem.

**Example 4:** Marissa drove 185 miles in 3 hours. Which of the following could be used to determine her average rate of speed?

- (1)  $185 + 3$
- (2)  $185 - 3$
- (3)  $3 \times 185$
- (4)  $\frac{185}{3}$
- (5)  $\frac{3}{185}$

**Option (4)** is correct. To find the rate, divide the distance by the time.

## WHOLE NUMBER ► PRACTICE 7

### A. Follow the order of operations to solve.

- $6 + 20 \times 2 =$
- $18 - 6 + 1 =$
- $4 + 5 \times 7 =$
- $48 \div 8 + 4 =$
- $3(24 - 19) =$
- $(34 - 24)(2 + 5) =$
- $9 + 6/3 =$
- $6 \times 10 \times 4 \div 8 =$
- $\frac{2(2 + 8)}{1 + 4} =$
- $\frac{105 - 55}{30 - 5} =$
- $\frac{8 \times 9}{3 \times 4} =$
- $\frac{4(2 + 5)}{2(3 + 4)} =$

### B. Choose the one best answer to each question.

- It is recommended that a person drink six 8-ounce glasses of water a day. Which expression shows how many ounces of water a person should drink over a 7-day period?
  - $6 + 8 + 7$
  - $6 \times 8 \div 7$
  - $6 \times 8 \times 7$
  - $8 \times 7 \div 6$
  - $8 \times 7 - 6$
- Driving to and from work, Ahmed pays a \$3 toll twice a day, 5 days a week. Which expression shows how much he has to pay in tolls in 1 week?
  - $\$3 \times 5$
  - $\$3 \times 2$
  - $\$3 \times \frac{5}{2}$
  - $\$3 \times \frac{2}{5}$
  - $\$3 \times 2 \times 5$
- Five co-workers bought a bouquet of flowers for \$25 and a box of candy for \$15 for a co-worker in the hospital. If they divided the cost equally, which expression shows how much each co-worker paid?
  - $\$25 + \$15$
  - $\$25 + \$15 \div 5$
  - $5(\$25 + \$15)$
  - $\frac{(\$25 + \$15)}{5}$
  - $\$25 + \$15 \times 5$
- Aaron gave \$10 toward a dinner bill of \$78. If the bill is evenly divided among the remaining 7 people in the group, which expression shows how much each person should pay?
  - $\frac{\$78 - \$10}{7}$
  - $\$78 \div 7$
  - $\$78 - \$10 \times 7$
  - $\$78 - \$10$
  - $\$78 - (\$10 \times 7)$
- Every day at lunch, Andrea buys a sandwich for \$4 and a cup of coffee for \$1. Which expression shows how much Andrea spends on lunch over a 5-day period?
  - $\$4 + \$1$
  - $\$4 \times \$1$
  - $\frac{\$4 + \$1}{5}$
  - $5(\$4) - 5(\$1)$
  - $5(\$4 + \$1)$
- A company offers a discount of \$5 off an \$85 bill for early payment. If this is a monthly bill, which expression shows how much could be saved yearly by always paying the bill early?
  - $12 \times \$5$
  - $\$85 - (12 \times \$5)$
  - $12 \times \$85$
  - $12(\$85 - \$5)$
  - $\frac{12(\$85)}{5}$

Answers and explanations begin on page 664.

# LANGUAGE ARTS, WRITING POST-TEST: PART I

Questions 1 through 7 refer to the following paragraphs.

## Painting a Room

### (A)

(1) Would you like to redecorate a room in your home? (2) Painting is a fast and inexpensive way to give that room a hole new look. (3) First, remove the furniture, or move it to the center of the room and cover it with drop cloths. (4) Prepare the room by stripping paint and extra layers of wallpaper, filling cracks, and add a coat of primer if necessary.

### (B)

(5) Now you're ready to paint. (6) Using a brush, a clean line is painted along all edges where paint stops, such as where the wall meets the door frame, and in places where the ceiling meets a wall of a different color. (7) This is called "cutting in."

### (C)

(8) The next step was to paint the room in the following order: ceiling, walls, trim, doors, windows. (9) Put no more than  $\frac{3}{4}$  of an inch of paint in the paint pan. (10) Run your roller through the paint, being careful not to overload the roller. (11) Apply paint to the ceiling and walls in a "W" or "Z" zigzag pattern.

### (D)

(12) Spread the paint evenly by rolling either side to side or up and down, using gentle strokes so as not to leave roller marks. (13) After finishing an area, look for spots you missed, go over them with your relatively dry roller.

### (E)

(14) To paint the window trim, raise the bottom sash and lower the top sash. (15) Paint the outer sash first, then the inner sash. (16) Next, reverse the position of the sashes without closing either one completely, and paint the parts of the sashes that you can reach. (17) Keep the window open, until the paint dries to the touch. (18) Then, finally, you can paint the sill and casing.

1. Sentence 2: **Painting is a fast and inexpensive way to give that room a hole new look.**

Which correction should be made to sentence 2?

- (1) change is to are
- (2) insert a comma after fast
- (3) change to give to giving
- (4) replace hole with whole
- (5) no correction is necessary

2. Sentence 4: **Prepare the room by stripping paint and extra layers of wallpaper, filling cracks, and add a coat of primer if necessary.**

Which correction should be made to sentence 4?

- (1) change Prepare to Preparing
- (2) insert a comma after paint
- (3) remove the comma after wallpaper
- (4) change add to adding
- (5) insert a comma after primer

3. Sentence 6: **Using a brush, a clean line is painted along all edges where paint stops, such as where the wall meets the door frame, and in places where the ceiling meets a wall of a different color.**

The most effective revision of sentence 6 would begin with which group of words?

- (1) A clean line, with a brush, is painted
- (2) The painting of a clean line is brushed
- (3) Paint by using and brushing
- (4) Painting a clean line, use a brush
- (5) Use a brush to paint a clean line



- 
4. Sentence 8: **The next step was to paint the room in the following order: ceiling, walls, trim, doors, windows.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) was
- (2) being
- (3) is
- (4) had been
- (5) will be

5. Sentence 13: **After finishing an area, look for spots you missed, go over them with your relatively dry roller.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) missed, go
- (2) missed, and go
- (3) missed, and going
- (4) missed go
- (5) missed, but go

6. Which revision would improve the effectiveness of the text?

- (1) join paragraphs A and B
- (2) begin a new paragraph with sentence 10
- (3) join paragraphs C and D
- (4) begin a new paragraph with sentence 13
- (5) join paragraphs D and E

7. Sentence 17: **Keep the window open, until the paint dries to the touch.**

Which correction should be made to sentence 17?

- (1) change Keep to Keeping
- (2) remove the comma
- (3) change dries to been dried
- (4) replace to with too
- (5) no correction is necessary

---

Questions 8 through 14 refer to the following paragraphs.

### Sick Building Syndrome

#### (A)

(1) Do you often feel sick when you're at work? (2) Do you experience symptoms such as coughing, sneezing, nausea, and difficulty breathing? (3) Do you have frequent headaches? (4) Do these symptoms seem to disappear once you leave work magically? (5) If so, you may be working in a sick building.

#### (B)

(6) "Sick building syndrome" is a term that referred to working in a building that makes you sick. (7) The syndrome may be caused by improper building design. (8) Over the past 20 years, architects have designed office buildings with an eye to saving energy. (9) The buildings are tightly sealed so that little heat escapes, and the air inside the buildings are recirculated to avoid the cost of heating fresh air. (10) Although this design reduces energy costs, the lack of ventilation causes a buildup of toxins in the air. (11) On the other hand an older building isn't necessarily immune to the syndrome. (12) Even if they originally opened to let in fresh air, adding insulation, caulking, and weather stripping at a later date may have made the windows airtight.

#### (C)

(13) Toxins in the air come from a variety of sources. (14) Biological agents including bacteria, viruses, fungi, and pollen, may be found in poorly maintained air circulation systems and dirty washrooms. (15) The deadly gas carbon monoxide can seep into a building's air through an improperly ventilated garage or a leaky duct. (16) Formaldehyde is frequently found in furniture, paneling, draperies, glues, and upholstery. (17) Other toxins come from volatile organic compounds (VOCs), which are released from certain solids and liquids as gases at room temperature. (18) Secondhand tobacco smoke is yet another source of toxins. (19) Sources of VOCs include copy machine toners, spray cans, felt tip markers, and correction fluid.

#### (D)

(20) It is possible to "cure" a sick building. (21) Steps to take include eliminating tobacco smoke, providing good ventilation, keeping the ventilation system in good repair, and removing all sources of pollution.

#### 8. Sentence 4: **Do these symptoms seem to disappear once you leave work magically?**

The most effective revision of sentence 4 would include which group of words?

- (1) disappear magically once you leave
- (2) symptoms, seeming to disappear
- (3) once you disappear magically
- (4) upon leaving work magically
- (5) seem to disappear, once you leave

#### 9. Sentence 6: **"Sick building syndrome" is a term that referred to working in a building that makes you sick.**

Which correction should be made to sentence 6?

- (1) insert a comma after term
- (2) change referred to refers
- (3) change working to having worked
- (4) insert a comma after building
- (5) change makes to made

- 
10. Sentence 9: **The buildings are tightly sealed so that little heat escapes, and the air inside the buildings are recirculated to avoid the cost of heating fresh air.**

Which correction should be made to sentence 9?

- (1) change are tightly to been tightly
- (2) change escapes to escaped
- (3) remove the comma
- (4) change are recirculated to is recirculated
- (5) no correction is necessary

11. Sentence 11: **On the other hand an older building isn't necessarily immune to the syndrome.**

Which correction should be made to sentence 11?

- (1) insert a comma after hand
- (2) change isn't to is'nt
- (3) change isn't to aren't
- (4) insert a comma after immune
- (5) replace to with too

12. Sentence 12: **Even if they originally opened to let in fresh air, adding insulation, caulking, and weather stripping at a later date may have made the windows airtight.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) they
- (2) them
- (3) it
- (4) the building
- (5) the windows

13. Sentence 14: **Biological agents including bacteria, viruses, fungi, and pollen, may be found in poorly maintained air circulation systems and dirty washrooms.**

Which correction should be made to sentence 14?

- (1) insert a comma after agents
- (2) change bacteria to Bacteria
- (3) change may be to has been
- (4) insert a comma after systems
- (5) no correction is necessary

14. Which revision would improve the effectiveness of the text?

- (1) join paragraphs A and B
- (2) move sentence 7 to follow sentence 8
- (3) begin a new paragraph with sentence 9
- (4) move sentence 12 to the beginning of paragraph C
- (5) move sentence 18 to follow sentence 16

---

Questions 15 through 21 refer to the following advertisement.

### Clothing Unlimited Buyers Club

#### (A)

(1) At Clothing Unlimited, we offer the highest quality merchandise at the best prices. (2) Now you can save even more money by joining our buyers club. (3) Benefits of membership are including discounts, free gifts, year-end rebates, and much more. (4) You may be aware that in the past, buyers club members got a 10 percent discount on all items purchased. (5) Well, times have changed. (6) We now offer discounts ranging from 10 percent to 75 percent. (7) Rather than giving a blanket discount, we assessed the discount for each item individually. (8) This change translates into bigger savings for members.

#### (B)

(9) Many of our customers live in other states. (10) They will be pleased to hear that one benefit of the buyers club is free shipping. (11) All orders over \$99 are shipped free of charge. (12) In addition, local customers may arrange for delivery at reduced prices.

#### (C)

(13) If you join the buyers club now, you will receive a free gift with every order. (14) That you place with our Website, clothes.com. (15) This offer is valid while supplies last.

#### (D)

(16) Buyers club membership fees are \$20 per year or \$40 for a lifetime membership. (17) Many of our customers report that they're membership fees pay for themselves several times over. (18) To join, simply fill out the form on the back of this page and return it to any Clothing Unlimited employee. (19) You'll be glad you did!

15. Sentence 3: **Benefits of membership are including discounts, free gifts, year-end rebates, and much more.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) are including
- (2) include
- (3) is including
- (4) includes
- (5) have included

16. Sentence 4: **You may be aware that in the past, buyers club members got a 10 percent discount on all items purchased.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) got
- (2) gotten
- (3) get
- (4) had got
- (5) getting

17. Which revision would improve the effectiveness of the advertisement?

Begin a new paragraph with

- (1) sentence 3
- (2) sentence 4
- (3) sentence 5
- (4) sentence 6
- (5) sentence 7

- 
18. Sentence 7: **Rather than giving a blanket discount, we assessed the discount for each item individually.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) assessed
  - (2) had assessed
  - (3) assess
  - (4) are assessing
  - (5) would have assessed
19. Sentences 9 and 10: **Many of our customers live in other states. They will be pleased to hear that one benefit of the buyers club is free shipping.**
- The most effective combination of sentences 9 and 10 would include which group of words?
- (1) free shipping to customers who live in
  - (2) living in other states, customers will
  - (3) one of the benefits, free shipping, is
  - (4) free shipping is a benefit of the club for
  - (5) customers who live in other states will be

20. Sentences 13 and 14: **If you join the buyers club now, you will receive a free gift with every order. That you place with our Website, clothes.com.**

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) order. That
  - (2) order, and that
  - (3) order that
  - (4) order, that
  - (5) order, so that
21. Sentence 17: **Many of our customers report that they're membership fees pay for themselves several times over.**
- Which correction should be made to sentence 17?
- (1) insert a comma after customers
  - (2) change report to reports
  - (3) replace they're with their
  - (4) insert a comma after themselves
  - (5) no correction is necessary

---

Questions 22 through 29 refer to the following paragraphs.

### Starting a Community Garden

#### (A)

(1) In many cities, neighborhood groups are forming community gardens in vacant lots, parks, or on rooftops. (2) These gardens is an ideal way for both children and adults to work with nature while making the neighborhood more beautiful.

#### (B)

(3) If you would like to start a community garden first determine whether people are truly interested in the project. (4) If they are, then decide what will be planted in the garden and who the garden is intended to serve. (5) Organize a meeting of interested people. (6) Choose someone to be the garden coordinator. (7) Form committees for tasks like finding money for the garden and developing youth activities.

#### (C)

(8) Once your group is organized, approach a sponsor—a group or individual who can support your garden. (9) Keep in mind that contributions of seeds, tools, and land are just as important as money. (10) Schools, churches, citizen groups, and private businesses are all potential sponsors.

#### (D)

(11) Find out how the land has been used in the past to avoid places that may be contaminated. (12) Pick a site that gets at least six hours of direct sunlight a day, and make sure that water is available. (13) Contact the owner of the site try to get a lease that allows you to use the land for at least three years.

#### (E)

(14) After choosing a site, the group of gardeners need to decide how to organize the garden. (15) What size should each plot be, and how will plots be assigned? (16) Will the group charge dues, and if so, how will the money be used? (17) Will the group plan certain activities together, such as composting? (18) How will watering and weeding be handled?

#### (F)

(19) Finally, remember that angry neighbors spell trouble for a community garden. (20) Neighbors often complain to city officials when a garden is unkempt or when the gardeners exhibited rowdy behavior. (21) Therefore, establish a procedure to follow so that the garden stays tidy and peaceful.

22. Sentence 1: **In many cities, neighborhood groups are forming community gardens in vacant lots, parks, or on rooftops.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) in vacant lots, parks, or on rooftops
- (2) in vacant lots, parks, or rooftops
- (3) in vacant lots, parks, rooftops
- (4) in vacant lots, in parks, or on rooftops
- (5) in the vacant lots, in the parks, on the rooftops

23. Sentence 2: **These gardens is an ideal way for both children and adults to work with nature while making the neighborhood more beautiful.**

Which correction should be made to sentence 2?

- (1) change gardens to garden
- (2) change is to are
- (3) replace way with weigh
- (4) insert a comma after children
- (5) change nature to Nature

- 
24. Sentence 3: **If you would like to start a community garden first determine whether people are truly interested in the project.**

Which correction should be made to sentence 3?

- (1) change would to will
- (2) insert a comma after garden
- (3) replace whether with weather
- (4) change are to is
- (5) no correction is necessary

25. Sentences 5 and 6: **Organize a meeting of interested people. Choose someone to be the garden coordinator.**

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) people. Choose
- (2) people, choose
- (3) people having chosen
- (4) people, then choosing
- (5) people, and choose

26. Which sentence would be most effective if inserted at the beginning of paragraph D?

- (1) Next, choose a site for the garden.
- (2) Land use is a very significant factor.
- (3) We all know that you are going to need land for your garden.
- (4) It's critical to have a site that gets lots of sunlight.
- (5) Learn about the history of your site.

27. Sentence 13: **Contact the owner of the site try to get a lease that allows you to use the land for at least three years.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) site try
- (2) site, try
- (3) site trying
- (4) site, you should try
- (5) site, and try

28. Sentence 14: **After choosing a site, the group of gardeners need to decide how to organize the garden.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) need
- (2) needs
- (3) needed
- (4) needing
- (5) will be needing

29. Sentence 20: **Neighbors often complain to city officials when a garden is unkempt or when the gardeners exhibited rowdy behavior.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) exhibited
- (2) exhibits
- (3) did exhibit
- (4) exhibit
- (5) will be exhibiting



---

Questions 30 through 36 refer to the following flyer.

**Save Compton Point!**

**(A)**

(1) Compton Point, home to many animal species that are threatened with extinction, now face a threat of its own. (2) Developers are in the process of acquiring the rights to part of this beautiful area. (3) They attempted to change the zoning in order to build a hotel, a tourist center, and an observation tower.

**(B)**

(4) If developers succeed in getting the rights to build, construction will begin next August. (5) The planned 30-story observation tower will be visible from a great distance. (6) Perhaps tourists will get a beautiful view of our area, but the tower will be a blight on our landscape.

**(C)**

(7) Sam Wanamaker, director of the Society for the Protection of Nature, warns that construction of the development is likely to drive out more than 30 animal species that live on the point. (8) Air pollution from tourist traffic will further reduce the animals' chances for survival. (9) Not to mention litter left behind by floods of tourists wandering through the area.

**(D)**

(10) The Compton Point area is zoned as natural parkland. (11) There are several other areas in the county that are zoned as natural parkland. (12) However, because this project is potentially so lucrative for the city, the zoning board seems to be bending to the will of the developers.

**(E)**

(13) Developers argue that the new jobs resulting from their development would boost the region's sagging economy. (14) The influx of tourism would too. (15) Certainly, everyone in the community agree that the economy around here could use a lift. (16) Development is, in fact, necessary, but it must be carried out carefully.

**(F)**

(17) Register your opposition to the development of Compton Point! (18) Come to a demonstration at 10 A.M. on Saturday, May 7, in front of the mayor's office, 34 Wilton road. (19) Bring signs with slogans that tell how you feel. (20) A strong turn out at this demonstration will send a message to developers.

30. Sentence 1: **Compton Point, home to many animal species that are threatened with extinction, now face a threat of its own.**

Which correction should be made to sentence 1?

- (1) change Point to point
- (2) remove the comma after Point
- (3) change are to is
- (4) remove the comma after extinction
- (5) change face to faces

31. Sentence 3: **They attempted to change the zoning in order to build a hotel, a tourist center, and an observation tower.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) attempted
- (2) attempt
- (3) are attempting
- (4) attempting
- (5) will have attempted

- 
32. Sentences 8 and 9: **Air pollution from tourist traffic will further reduce the animals' chances for survival. Not to mention litter left behind by floods of tourists wandering through the area.**

The most effective combination of sentences 8 and 9 would include which group of words?

- (1) Tourism increases both air pollution and litter, which will
  - (2) Litter, which tourists leave behind, and besides
  - (3) Animals will have less chance for survival when air pollution
  - (4) Air pollution and litter, having been caused by tourists,
  - (5) Tourists pollute the air, and they also leave litter behind them
33. Which revision would improve the effectiveness of paragraph D?
- (1) remove sentence 10
  - (2) remove sentence 11
  - (3) move sentence 10 to follow sentence 11
  - (4) move sentence 10 to follow sentence 12
  - (5) no revision is necessary

34. Sentences 13 and 14: **Developers argue that the new jobs resulting from their development would boost the region's sagging economy. The influx of tourism would too.**

The most effective combination of sentences 13 and 14 would include which group or words?

- (1) the development, with an influx of jobs,
- (2) new jobs and the influx of tourism resulting
- (3) an influx of new jobs, say the developers, plus an influx of tourism,
- (4) To boost the sagging economy,
- (5) The region, to have an influx,

35. Sentence 15: **Certainly, everyone in the community agree that the economy around here could use a lift.**

Which correction should be made to sentence 15?

- (1) remove the comma after Certainly
- (2) change agree to agrees
- (3) replace here with hear
- (4) change could use to could be using
- (5) no correction is necessary

36. Sentence 18: **Come to a demonstration at 10 A.M. on Saturday, May 7, in front of the mayor's office, 34 Wilton road.**

Which correction should be made to sentence 18?

- (1) insert a comma after demonstration
- (2) remove the comma after Saturday
- (3) change mayor's to mayors
- (4) change mayor's to Mayor's
- (5) change road to Road

---

Questions 37 through 43 refer to the following paragraphs.

**Chocolate: A Treat Throughout the Ages**

**(A)**

(1) Few people can resist the charms of chocolate. (2) This luscious, creamy treat not only gives an instant boost of energy, but it also brings a sense of emotional comfort. (3) Touted as an aphrodisiac, chocolate is a common romantic gift. (4) Some people, self-proclaimed “chocololics,” are obsessed with this sweet pleasure. (5) Where, then, does chocolate come from?

**(B)**

(6) The Aztecs were the first to use cacao beans, turning them into a frothy beverage that was supposed to be stimulating and healthful. (7) Only nobility, warriors, and clergy were permitted to have this drink. (8) One rumor has it that the emperor Montezuma used to drink this chocolate beverage before a romantic evening with one of his wives.

**(C)**

(9) Chocolate first made its appearance in England and Italy in the 1600s, and by 1765, it had made its way to the colonies in North America. (10) The Swiss, now world famous for their chocolates, begun their fascination with the sweet in the mid-1800s. (11) Two Swiss men, Henry Nestle and Daniel Peter, figured out how to mix sweetened condensed milk with chocolate to get chocolate milk. (12) The chocolate bar was invented in 1879 when Rudolph Lindt added cocoa butter to chocolate.

**(D)**

(13) The Spanish Explorer Hernán Cortés brought the drink to Spain in 1519, but the public did not learn of it for another hundred years. (14) However, it became popular after Anne of Austria, wife of Louis XII declared it the drink of the French court in 1615.

**(E)**

(15) Chocolate has become a multibillion dollar industry. (16) As a result, each company’s chocolate recipes are closely guarded. (17) In 1980, an apprentice of a Swiss company was caught trying to sell secret chocolate recipes to China, Saudi Arabia, and Russia.

**(F)**

(18) A recent study of 8,000 college graduates showed that chocolate eaters live longer than those who refrain. (19) Researchers believe that this affect is due to the fact that chocolate contains high levels of polyphenol, a substance that protects against heart disease.

37. Sentence 2: **This luscious, creamy treat not only gives an instant boost of energy, but it also brings a sense of emotional comfort.**

Which correction should be made to sentence 2?

- (1) remove the comma after luscious
- (2) change gives to give
- (3) remove the comma after energy
- (4) insert a comma after but
- (5) no correction is necessary

38. Sentence 6: **The Aztecs were the first to use cacao beans, turning them into a frothy beverage that was supposed to be stimulating and healthful.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) beans, turning
- (2) beans turning
- (3) beans. Turning
- (4) beans, and turning
- (5) beans, and by turning

- 
39. Sentence 10: **The Swiss, now world famous for their chocolates, begun their fascination with the sweet in the mid-1800s.**

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) begin
- (2) beginning
- (3) begun
- (4) began
- (5) had began

40. Sentence 13: **The Spanish Explorer Hernán Cortés brought the drink to Spain in 1519, but the public did not learn of it for another hundred years.**

Which correction should be made to sentence 13?

- (1) change Spanish to spanish
- (2) change Explorer to explorer
- (3) insert a comma after Cortés
- (4) change brought to brung
- (5) remove the comma after 1519

41. Sentence 14: **However, it became popular after Anne of Austria, wife of Louis XII declared it the drink of the French court in 1615.**

Which correction should be made to sentence 14?

- (1) remove the comma after However
- (2) change Austria to austria
- (3) remove the comma after Austria
- (4) insert a comma after XII
- (5) change court to Court

42. Which revision would improve the effectiveness of the article?

- (1) join paragraphs A and B
- (2) remove paragraph B
- (3) move paragraph C to follow paragraph D
- (4) remove paragraph D
- (5) join paragraphs E and F

43. Sentence 19: **Researchers believe that this affect is due to the fact that chocolate contains high levels of polyphenol, a substance that protects against heart disease.**

Which correction should be made to sentence 19?

- (1) replace affect with effect
- (2) insert a comma after fact
- (3) change contains to contain
- (4) remove the comma
- (5) change protects to protected

---

Questions 44 through 50 refer to the following letter.

Dr. Calvin R. Simotas  
904 East 79th Street  
Chicago, IL 60626

Dear Patient:

**(A)**

(1) I will soon be joining the faculty of Holworth University Hospital in the downtown area of Chicago. (2) In addition to teaching at the medical school, I continue to see private patients.

**(B)**

(3) We will all benefit from this move to Holworth. (4) First and foremost are its excellent facilities. (5) A spacious, comfortable waiting room is only the start. (6) Numerous examining rooms will help make your visit as pleasant and time efficient as possible, not to mention that they are state of the art. (7) Consultations with different specialists at Holworth will now be possible as well.

**(C)**

(8) The move to the new office will take place on October 13. (9) No patients will be seen from October 11 to October 15. (10) If you know that you will need medical care before October please make your appointment right away. (11) It might be hard to get an appointment during the holiday season as well.

**(D)**

(12) The new office is located in the faculty practice building of the Hospital at 180 N. Commerce Avenue, Suite 700. (13) The office is conveniently located close to several bus and train lines and is accessible from all parts of the city. (14) In addition, a large underground parking lot is located across the street.

**(E)**

(15) I've enjoyed serving you over the years at my 79th Street office. (16) If you would like to see me at my new office, it is necessary for you to sign the enclosed form to release your files. (17) Please fill out the form and return it to me at the 79th Street address. (18) I look forward to seeing you soon.

All the best,  
Calvin R. Simotas, M.D.

44. Sentence 2: **In addition to teaching at the medical school, I continue to see private patients.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) continue
- (2) will continue
- (3) continued
- (4) have continued
- (5) continuing

45. Sentence 6: **Numerous examining rooms will help make your visit as pleasant and time efficient as possible, not to mention that they are state of the art.**

The most effective revision of sentence 6 would begin with which group of words?

- (1) Numerous state-of-the-art examining rooms
- (2) A pleasant and time efficient visit will be had
- (3) Numerous, pleasant examining rooms that are
- (4) Examining rooms that are numerous and
- (5) Helping make your visit pleasant and time efficient

- 
46. Sentence 10: **If you know that you will need medical care before October please make your appointment right away.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) October please
  - (2) October, and please
  - (3) October, please
  - (4) October, then please
  - (5) October. Please
47. Which revision would improve the effectiveness of the letter?
- (1) move sentence 3 to the end of paragraph A
  - (2) move sentence 5 to follow sentence 7
  - (3) remove sentence 8
  - (4) move sentence 9 to follow sentence 11
  - (5) remove sentence 11

48. Sentence 12: **The new office is located in the faculty practice building of the Hospital at 180 N. Commerce Avenue, Suite 700.**

Which correction should be made to sentence 12?

- (1) change is to being
- (2) change located with locating
- (3) insert a comma after building
- (4) change Hospital to hospital
- (5) change Avenue to avenue

49. Sentence 15: **Iv'e enjoyed serving you over the years at my 79th Street office.**

Which correction should be made to sentence 15?

- (1) change Iv'e to I've
- (2) change enjoyed to been enjoying
- (3) insert a comma after years
- (4) change office to Office
- (5) no correction is necessary

50. Sentence 16: **If you would like to see me at my new office, it is necessary for you to sign the enclosed form to release you're files.**

Which correction should be made to sentence 16?

- (1) remove would
- (2) remove the comma
- (3) replace for with four
- (4) insert a comma after form
- (5) change you're to your

**Answers and explanations begin on page 612.**

---

# LANGUAGE ARTS, WRITING POST-TEST: PART II

## Essay Directions and Topic

Look at the box on the next page. In the box are your assigned topic and the letter of that topic.

You must write on the assigned topic **ONLY**.

You will have 45 minutes to write on your assigned essay topic. You may return to the multiple-choice section after you complete your essay if you have time remaining in this test period. Do not return the Language Arts, Writing Test booklet until you finish both Parts I and II of the Language Arts, Writing Test.

Two evaluators will score your essay according to its overall effectiveness. Their evaluation will be based on the following features:

- Well-focused main points
- Clear organization
- Specific development of your ideas
- Control of sentence structure, punctuation, grammar, word choice, and spelling

**REMEMBER, YOU MUST COMPLETE BOTH THE MULTIPLE-CHOICE QUESTIONS (PART I) AND THE ESSAY (PART II) TO RECEIVE A SCORE ON THE LANGUAGE ARTS, WRITING TEST.** To avoid having to repeat both parts of the test, be sure to do the following:

- Do not leave the pages blank.
- Write legibly in ink so that the evaluators will be able to read your writing.
- Write on the assigned topic. If you write on a topic other than the one assigned, you will not receive a score for the Language Arts, Writing Test.
- Write your essay on the lined pages of the separate answer sheet booklet. Only the writing on these pages will be scored.

Reprinted with permission of the GED Testing Service of the American Council on Education.



---

**TOPIC**

What is the secret to staying young at heart, even as your body grows older?

In your essay, describe things that help people to continue feeling young. Use your personal observations, experiences, and knowledge.

Part II is a test to determine how well you can use written language to explain your ideas. In preparing your essay, you should take the following steps:

- Read the **DIRECTIONS** and the **TOPIC** carefully.
- Plan your essay before you write. Use the scratch paper provided to make any notes. These notes will be collected but not scored.
- Before you turn in your essay, reread what you have written and make any changes that will improve your essay.

Your essay should be long enough to develop the topic adequately.

**Essay evaluation guidelines start on page 614.**

# GED POST-TESTS

On the following pages, you will see practice tests for the five GED Tests:

- Language Arts, Writing
- Social Studies
- Science
- Language Arts, Reading
- Mathematics

You should use these full-length tests to see where you stand before you take the actual GED. As on the test, most of the questions will be in multiple-choice format. You may circle or check off your answers in this book or write them on a separate sheet of paper. There are two exceptions to this:

1. You will need to write an essay for Part II of the *Language Arts, Writing Test*.
2. On the *Mathematics Test*, you will need to fill in an answer sheet similar to the one that you will see on the GED Test. It includes three types of items:

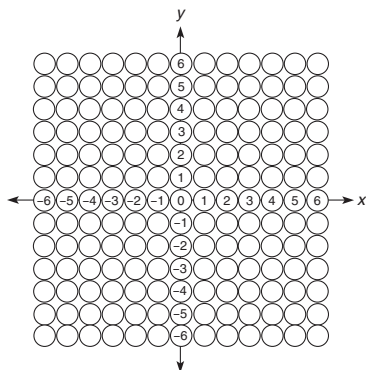
- **Answer choices** to “bubble-in” like this:



- A **grid** to be filled in like this:

	1	/	3	
	1	●	1	
.	.	.	.	.
0	0	0	0	0
1	●	1	1	1
2	2	2	2	2
3	3	3	●	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

- A **coordinate graph** to be filled in with a plotted point:



Be sure to check your answers with the *Post-Test Answers and Explanations* that begin on page 612. At the end of each set of answers is a *Post-Test Evaluation Chart*. These charts enable you to target your problem areas. You can use the “Total Correct” for each test to estimate your Post-Test score and relate it to passing scores on the actual GED Tests. Use your scores to work with the *Kaplan GED Post-Test Score Conversion Charts* on the inside back cover of this book.

---

# LANGUAGE ARTS, READING POST-TEST

Questions 1 through 5 refer to the following excerpt from an article.

## HOW CAN YOU BETTER UNDERSTAND YOUR INTERVIEWER?

It is intrinsic to human nature to take the measure of the people we meet. We do it all the time, automatically. We develop an instinctive way of reading others that is

(5) sometimes the saving of us and at other times can prove to be our undoing. It is this instinct that makes us form instant, lifelong relationships with some people or causes us to give a wide berth to others because

(10) we get a “funny” feeling about them. With some careful consideration and planning, though, these “feelings” can be honed into a useful tool for gauging the personality and character of interviewers and, by extension,

(15) their expectations of potential employees. Let’s examine some clues.

**Their e-mail.** You can tell a lot about your interviewer by his or her e-mail messages. Some interviewers are very warm,

(20) writing in a conversational style, addressing you by your first name. Others are witty, mixing little jokes and humorous remarks in with job-related questions. Still others get right down to business—no chit-chat or

(25) informality. Before you ever meet the interviewer, you begin to form certain “pictures” of the person, based on his or her approach and style. But it still remains for you to check him or her out face-to-face.

(30) **Their office.** Let’s begin with the physical setting of interviewers’ offices. Some put a desk the size of a 747 between themselves and you. This is a clear message to you to keep your distance. A straight-

(35) backed, rigid chair for the applicant says, “O.K. Let’s get down to business, and then you leave so I can get back to mine.” Here, you would be advised to adopt a crisp, businesslike style, with brief, professional

(40) answers. And, for heaven’s sake, **don’t touch that desk!**

Then, there is the homey, comfortable environment—kids’ pictures on the desk, executive “toys” around, soft chairs, and a

(45) sofa. There may not even be a desk between the applicant and the interviewer, but rather two chairs grouped around a coffee table. This environment invites more intimacy. It says, “Be yourself. Tell me

(50) about who you are so I can get to know you.” Here, your manner, though still professional, should be relaxed and open, more personable. It would be a mistake with this employer to sit ramrod straight

(55) and give cool, truncated responses to the questions.

From “Sizing Up the Interviewer” by Fred Jandt and Mary Nemnich, Indianapolis: JIST Works, 1997.

- 
1. Based on information in the article, at which of the following situations should you be formal at an interview?  
when the interviewer
    - (1) calls you by your first name
    - (2) asks you how your family is
    - (3) offers you coffee and doughnuts
    - (4) tells jokes
    - (5) sits far away from you
  2. With which of the following would the authors most likely agree?
    - (1) Interviewers will try to trick you at every turn.
    - (2) An inconsiderate interviewer is very common.
    - (3) All professional interviewers will be very organized.
    - (4) Almost all job interviews are disappointing.
    - (5) An interviewee should know how to read cues from an interviewer.
  3. What is the purpose of this article?
    - (1) to raise awareness about incompetent interviewers
    - (2) to describe types of interviewers and how to approach them
    - (3) to guarantee a perfect interview with an employer
    - (4) to explain how to e-mail an interviewer
    - (5) to put a stop to lengthy and formal interviews
  4. Which of the following best describes the style in which this excerpt is written?
    - (1) friendly and conversational
    - (2) technical and dry
    - (3) detailed and elaborate
    - (4) humorous and wordy
    - (5) vague and misleading
  5. What shift occurs after the first paragraph?
    - (1) mood changes from pessimistic to more optimistic
    - (2) focus changes from interviewing to people skills
    - (3) tone changes from personal to lecturing
    - (4) content changes from general to more specific
    - (5) emphasis changes from good interviewers to poor interviewers

---

Questions 6 through 11 refer to the following piece of nonfiction.

### WHAT CRUCIAL MISTAKE DID U.S. AUTOMAKERS MAKE?

The domestic automakers had a huge market share coming into the 1970s but, unfortunately, were upsetting customers left and right. The Detroit auto manufacturers

(5) were able to keep their costs low and profits high in part by producing sub-par cars. Sure, their cars looked nice on the auto dealer's lot, but after a short time in use, many of the U.S.-manufactured cars developed far more problems than their foreign equivalents. And, to add insult to injury, U.S. auto customers didn't get particularly good customer service when they brought their cars in for needed tune-ups and

(10) repairs.

(15)

The chief bean counters and the management of the major U.S. automakers weren't considering the bigger picture when they analyzed their companies' financial

(20) statements during the 1970s. These companies were too focused on their short-term profitability and weren't considering the after-sales service that was required as a result of their initially shoddy products.

(25) Not surprisingly, the U.S. automakers lost tremendous market share at the expense of the best foreign automakers during the 1970s and 1980s. In fact, one of the big four U.S. automakers—Chrysler—

(30) nearly went bankrupt and was saved only because of a government bailout.

In the long run, the Detroit automakers learned the hard way that getting your product right the first time is less costly and

(35) more profitable than retrenching to play catch-up. Customers aren't stupid, and if you continually sell them shoddy merchandise (especially when better merchandise is available from other sources), they won't

(40) come back the next time they're in the market for the products and services you have to offer. What's more, they'll tell others of their lousy experience with your company.

Although the major U.S. automakers ultimately got their act together in the

(45) 1990s and have stopped the erosion of market share, they still feel the financial pain from the millions of customers they alienated and lost to foreign competitors in the two preceding decades.

(50)

From *Small Business for Dummies* by Eric Tyson and Jim Schell, Foster City, Calif.: IDG Books, 2000.

- 
6. Which of the following reasons is given for why U.S. automakers lost business in the 1970s and 1980s?
- (1) They could not afford to make good cars.
  - (2) Their cars did not look as attractive as foreign cars.
  - (3) They charged too much for their cars.
  - (4) They did not offer enough places to get their cars repaired.
  - (5) Their cars were not of the highest quality.
7. What do the authors suggest was one of the goals of foreign automakers?
- Foreign automakers
- (1) studied and then improved on the design of U.S. cars
  - (2) deliberately underpriced their cars to get a share of the U.S. market
  - (3) were initially disinterested in selling to U.S. customers
  - (4) wanted to build quality cars with few repair problems
  - (5) put short-term profitability above all else
8. What is meant by the phrase “chief bean counters” (line 16)?
- (1) inventory managers
  - (2) assembly line workers
  - (3) major automakers
  - (4) the government
  - (5) financial executives
9. This excerpt is most likely taken from what type of reading material?
- (1) a company memo
  - (2) a letter to the editor
  - (3) a business manual
  - (4) a scientific report
  - (5) an eyewitness account
10. Which of the following words best describes the authors’ tone toward U.S. automakers?
- (1) critical
  - (2) proud
  - (3) approving
  - (4) demeaning
  - (5) arrogant
11. Later, the authors advise: “As a small-business owner, remember that if you don’t get your product right the first time, you may not have a second chance.”
- Based on this information and the excerpt, who did get a second chance?
- (1) U.S. automakers
  - (2) foreign automakers
  - (3) U.S. auto buyers
  - (4) small-business owners
  - (5) the government

---

Questions 12 through 16 are based on this excerpt from a short story.

### WHY DOES MARJIE ASK FOR MONEY?

After a while, there was a ring at the back door. The children scampered in from the garden, while Jennie answered the ring.

“Baker,” said the man.

- (5) “Oh, yes,” said Jennie: “wait, I’ll get my purse.”

I went on writing my letter, only half hearing the sound of Jennie’s small-change as she, presumably, paid the baker’s man.

- (10) In a moment, Marjie was by my side.

“Hallo,” I said.

Marjie did not answer.

“Hallo, Marjie,” I said. “Have you come to keep me company?”

- (15) “Listen,” said little Marjie in a whisper, looking over her shoulder. “Listen.”

“Yes,” I said.

She looked over her shoulder again, as if afraid her mother might come in.

- (20) “Will you give me half-a-crown?” whispered Marjie, holding out her hand.

“Well,” I said, “what do you want it for?”

“I want it,” said Marjie, looking furtively behind her again.

- (25) “Would your mummy want you to have it?” I said.

“Give me half-a-crown,” said Marjie.

“I’d rather not,” I said. “But I’ll tell you what, I’ll buy you a—”

- (30) But Marjie had fled, out of the door, into the kitchen. “She’d rather not,” I heard her say to someone.

Presently, Jennie came in, looking upset.

- (35) “Oh,” she said, “I hope you didn’t feel hurt. I only wanted to pay the baker, and I hadn’t enough change. He hadn’t any either; so just on the spur of the moment I sent Marjie for a loan of half-a-crown till tonight. But I shouldn’t have done it. I *never* borrow anything as a rule.”
- (40)

“Well, of course!” I said. “Of course I’ll lend you half-a-crown. I’ve got plenty of change. I didn’t understand and I got the message all wrong; I thought she wanted it for herself and that you wouldn’t like that.”

- (45)

Jennie looked doubtful. I funkled explaining the whole of Marjie’s act. It isn’t easy to give evidence against a child of five.

- (50)

“Oh, they never ask for money,” said Jennie. “I would never allow them to ask for anything. They never do *that*.”

- (55) “I’m sure they don’t,” I said, floundering a bit.

From “The Twins” by Muriel Spark, from the book *The Go-Away Bird and Other Stories* J. B. Lippincott Company.



- 
12. What does Marjie's looking over her shoulder suggest to the narrator?
- The narrator thinks Marjie
- (1) is imagining what she'll do with the money
  - (2) has forgotten something in the other room
  - (3) is shy and lacks confidence
  - (4) is afraid of the baker
  - (5) is hoping her mother won't hear her asking for money
13. Which of the following becomes evident during the discussion between Jennie and the narrator?
- (1) Jennie knows the narrator wanted to lend her the money.
  - (2) Jennie can't believe that the narrator wouldn't lend her the money.
  - (3) Jennie is perplexed when the narrator blames Marjie.
  - (4) The narrator begins to mistrust Jennie and Marjie.
  - (5) The narrator and Jennie resolve the misunderstanding.
14. If Jennie were criticized by her boss at work, what would she most likely do?
- (1) resent it in silence
  - (2) discuss it defensively
  - (3) not take it seriously
  - (4) argue forcefully
  - (5) gossip about her boss
15. What kind of relationship do Jennie and the narrator have?
- (1) They are cool and indifferent to each other.
  - (2) They frequently disagree on matters.
  - (3) They know each other but are not close.
  - (4) Jennie bosses the narrator around.
  - (5) Jennie takes advantage of the narrator.
16. Which of the following best describes the situation presented in this excerpt?
- (1) uplifting
  - (2) humorous
  - (3) sad
  - (4) uncomfortable
  - (5) sentimental

---

Questions 17 through 22 refer to the following excerpt from a short story.

**DOES CLEO TAKE ADVANTAGE OF HER FAMILY'S AFFECTION?**

He gave them each a copper, too, though he could hardly spare it, what with four of them to feed and Mama wanting yard goods and buttons and ribbons to

(5) keep herself feeling proud of the way she kept her children. Time was, he gave them kisses for toting his bucket. But the day Cleo brazenly said, I don't want a kiss, I want a copper, the rest of them shame-

(10) facedly said it after her. Most times Pa had a struggle to dig down so deep. Four coppers a day, six days a week, was half a day's pay gone up in smoke for candy.

Pa couldn't bring himself to tell Mama.

(15) She would have wrung out of him that Cleo had been the one started it. And Cleo was his eldest. A man who loved his wife couldn't help loving his first-born best, the child of his fiercest passion. When that first-born

(20) was a girl, she could trample on his heart, and he would swear on a stack of Bibles that it didn't hurt.

The sisters put their coppers in their pinafore pockets and skipped back through

(25) the woods.

Midway Cleo stopped and pointed to a towering oak. "You all want to bet me a copper I can't swing by my feet from up in that tree?"

(30) Lily clapped her hands to her eyes. "I doesn't want to bet you," she implored. "I ain't fixing to see you fall."

Serena said severely, "You bust your neck, you see if Mama don't bust it again."

(35) Charity said tremulously, "Cleo, what would us do if our sister was dead?"

Cleo saw herself dressed up fine as Josie Beauchamp, stretched out in a coffin with her sisters sobbing beside it, and Pa

(40) with his Sunday handkerchief holding his tears, and Mama crying, I loved you best, Cleo. I never said it when you were alive. And I'm sorry, sorry, I waited to say it after you were gone.

(45) "You hold my copper, Charity. And if I die, you can have it."

Lily opened two of her fingers and peeped through the crack. "Cleo, I'll give you mine if you don't make me see you

(50) hanging upside down." It was one thing to hear Cleo tell about herself. It was another thing to see her fixing to kill herself.

"Me, too," said Serena, with a little sob,

(55) more for the copper than for Cleo, whom she briefly hated for compelling unnecessary sacrifice.

Reprinted from *The Living Is Easy*, copyright 1948, 1975 by Dorothy West, by permission of the Feminist Press at the City University of New York, [www.feministpress.org](http://www.feministpress.org).

- 
17. What is the “copper” that Pa gave each of the girls?
- (1) a coin
  - (2) a piece of candy
  - (3) a hug
  - (4) a piece of copper tubing
  - (5) a small gift
18. What conflict does Pa feel?
- He wishes
- (1) he had a job that was less demanding
  - (2) his children helped with the chores
  - (3) his wife cared more about their children
  - (4) he could say “no” to his children
  - (5) his children were more polite
19. Which of the following best describes Cleo?
- (1) loving
  - (2) thoughtful
  - (3) bold
  - (4) fragile
  - (5) serious
20. How do Cleo’s sisters respond to her idea for a bet?
- (1) eagerly
  - (2) negatively
  - (3) indifferently
  - (4) angrily
  - (5) daringly
21. Which of the following would Cleo probably enjoy?
- (1) jumping from a roof before an audience
  - (2) sewing clothes with her mother
  - (3) reading a good book
  - (4) treating her sisters to candy
  - (5) surprising her father with a gift
22. Based on the information in the excerpt, which of the following do you predict would happen next?
- (1) Cleo hangs upside down and gets the coppers.
  - (2) Pa scolds Cleo for her behavior.
  - (3) Mama punishes the other children for giving in to Cleo.
  - (4) Mama finds out that Pa gave coppers to the girls.
  - (5) Cleo gets all of her sisters’ coppers without having to do anything.

---

Questions 23 through 28 refer to the following excerpt from a novel.

**WHAT IS LAVINIA'S OPINION ABOUT CARING FOR ELDERLY PARENTS?**

(5) “When he became ill at first, when the strokes led to paralysis, he was very embarrassed for anyone to see him. He was a very proud man. I suppose I didn’t have the heart or the will to oppose him, but it seemed natural, after a while, to go on, once I’d started taking care of him. I felt that he’d been through so much physically I didn’t want to fight him.”

(10) “So you had him all to yourself, then,” said Lavinia, as if we had been talking about a date with a movie star. Something in her tone frightened me. Whatever I said would be greeted by this probing incomprension.  
(15) hension.

“There wasn’t really anyone else,” I went on. “My mother died when I was a baby.”

“And no professional help?”

(20) “You have to understand, Lavinia, that for my father, the parish was the community. There weren’t social workers and psychologists. There were priests.”

“And what did they tell you?”

(25) “I didn’t ask. I didn’t have to. It was simply assumed that I would step in.”

“And you didn’t think of going outside for professional help or advice?”

It suddenly occurred to me that Lavinia (30) probably thought me a lunatic or an imbecile. I asked myself the question that Lavinia had just asked me, but my only answer was the stupidest possible one: no, I hadn’t thought there was a choice in the (35) matter. It had all seemed exceedingly straightforward. My father was helpless. I would care for him. He wanted me, and I was there. It had all rolled out before me inevitable as a road. I would say to Lavinia (40) that I was very young when he first became ill.

From *Final Payments* by Mary Gordon, New York: Random House, 1978.

- 
23. What reason does the narrator give for taking care of her father?
- (1) She was too young to know better.
  - (2) She wanted to with all her heart.
  - (3) The priest insisted it was the right thing.
  - (4) She couldn't find professional help.
  - (5) It seemed the natural thing to do.
24. When the narrator says, "Something in her tone frightened me" (lines 12–13), what is she revealing?
- (1) She knows she made the wrong choice.
  - (2) She realizes Lavinia thinks she is foolish.
  - (3) She is afraid her father is going to die.
  - (4) She knows Lavinia will force her to try to explain her situation.
  - (5) She is uncomfortable talking to Lavinia.
25. Which of the following is in keeping with the narrator's character?
- (1) running away
  - (2) standing up for what she wants
  - (3) exaggerating her situation
  - (4) pretending to be a saint
  - (5) doing what is expected of her
26. Which of the following statements best conveys Lavinia's attitude toward life?
- (1) Treat others as you would have them treat you.
  - (2) Family comes first.
  - (3) Make things as easy on yourself as possible.
  - (4) Subtlety is the best policy.
  - (5) There are always choices in life.
27. Based on her character as revealed in this excerpt, how would Lavinia walk through a crowded room?
- (1) pointedly and confidently
  - (2) carefully and politely
  - (3) angrily and rudely
  - (4) shyly and slowly
  - (5) clumsily and loudly
28. What two qualities are contrasted in this excerpt?
- (1) ignorance and knowledge
  - (2) pain and pleasure
  - (3) sincerity and insincerity
  - (4) needs and wants
  - (5) self-centeredness and self-sacrifice

---

Questions 29 through 34 refer to the following poem.

**DOES THE SPEAKER WORK ALONE?**

**The Tuft of Flowers**

I went to turn the grass once after one  
Who mowed it in the dew before the sun.  
The dew was gone that made his blade so keen  
Before I came to view the leveled scene.

- (5) I looked for him behind an isle of trees;  
I listened for his whetstone on the breeze.  
But he had gone his way, the grass all mown,  
And I must be, as he had been—alone,  
“As all must be,” I said within my heart,  
(10) “Whether they work together or apart.”  
But as I said it, swift there passed me by  
On noiseless wing a bewildered butterfly,  
Seeking with memories grown dim o’er night  
Some resting flower of yesterday’s delight.  
(15) And once I marked his flight go round and round,  
As where some flower lay withering on the ground.  
And then he flew as far as eye could see,  
And then on tremulous wing came back to me.  
I thought of questions that have no reply,  
(20) And would have turned to toss the grass to dry;  
But he turned first, and led my eye to look  
At a tall tuft of flowers beside a brook,  
A leaping tongue of bloom the scythe had spared  
Beside a reedy brook the scythe had bared.  
(25) The mower in the dew had loved them thus,  
By leaving them to flourish, not for us,  
Nor yet to draw one thought of ours to him,  
But from sheer morning gladness at the brim.  
The butterfly and I had lit upon,  
(30) Nevertheless, a message from the dawn,  
That made me hear the wakening birds around,  
And hear his long scythe whispering to the ground.  
And feel a spirit kindred to my own;  
So that henceforth I worked no more alone;  
(35) But glad with him, I worked as with his aid,  
And weary, sought at noon with him the shade;  
And dreaming, as it were, held brotherly speech  
With one whose thought I had not hoped to reach  
“Men work together,” I told him from the heart,  
(40) “Whether they work together or apart.”

From THE POETRY OF ROBERT FROST edited by Edward Connery Lathem, © 1969 by Henry Holt & Co., LLC.

- 
29. What was the butterfly doing when the speaker first saw it (lines 11–12)?
- (1) escaping the mower
  - (2) leading the poet to the river
  - (3) looking for a flower from the day before
  - (4) showing the poet that it was spring
  - (5) resting on a blade of grass
30. Why does the speaker call the flowers “a leaping tongue of bloom” (line 23) because the flowers
- (1) are swaying in the wind
  - (2) are the shape and color of a tongue of fire
  - (3) survived the mowers’ scythe
  - (4) seem to be calling out to him
  - (5) are about ready to burst open
31. Why did the mower leave the flowers untouched? because he
- (1) knew butterflies would look for them
  - (2) wanted to leave flowers for the speaker
  - (3) got tired and decided to rest
  - (4) appreciated their beauty
  - (5) neglected to see them
32. What did the tuft of flowers help the speaker understand?
- (1) Spring had finally come.
  - (2) He and the mower were kindred spirits.
  - (3) Flowers have a beauty all their own.
  - (4) Men are by nature distant from each other.
  - (5) Nature must be preserved.
33. What type of person does the speaker seem to be?
- (1) humorous
  - (2) sad
  - (3) thoughtful
  - (4) playful
  - (5) friendly
34. If music were to accompany this poem, what type of music would be best?
- (1) hip-hop
  - (2) quiet classical
  - (3) rock ‘n’ roll
  - (4) jazz
  - (5) country western



---

Questions 35 through 40 refer to the following excerpt from a play.

**HOW DO THESE PROFESSORS REGARD PEOPLE?**

- PROFESSOR B: [*Looking at some photos.*]  
You know what I like best about human beings?
- PROFESSOR A: What?
- (5) PROFESSOR B: Their feet. Not only are feet durable and sophisticated in their design, they're—well, they're very cute.
- STUDENT: Thank you.
- PROFESSOR B: [*Referring to photos.*] Can I (10) save these?
- STUDENT: Sure.
- PROFESSOR A: I have *one* question regarding the human being.
- STUDENT: Yes?
- (15) PROFESSOR A: Why did you make them so stupid?
- DEAN: That's a biased question.
- PROFESSOR A: All right, I'll rephrase it: Why didn't you make them smart?
- (20) STUDENT: I think they're smart. They've created great civilizations. They've developed magnificent tools and brilliant works of art. Their awareness of the universe is increasing exponentially.
- (25) PROFESSOR A: Stop exaggerating. It took them centuries just to come up with the concept of the sandwich. How smart do you have to be to think of putting a piece of meat between two pieces of bread?
- (30) STUDENT: But look at what else they've done. Look at what they've done with their languages. Look at English. With only 26 letters, they've built a body of literature with great power, feeling and (35) insight.
- PROFESSOR A: So? The creatures on one of the other students' planets created a body of literature that's twice as profound, and with only 17 letters. No (40) wasted, inefficient letters like X or Q. Imagine inventing a letter you can only use if it's followed by a U. What was going on in their heads?
- STUDENT: Still, any species that has produced William Shakespeare . . . (45)
- PROFESSOR A: Isn't he the one who wrote, "What a piece of work is man! How noble in reason, how infinite in faculty."
- STUDENT: Yes.
- (50) PROFESSOR A: What a bunch of self-serving rubbish.
- DEAN: You don't expect a good grade just because you created *one* genius do you?
- STUDENT: Of course not. The species has (55) also produced Socrates, Freud, Madame Curie, Gandhi, Darwin—
- PROFESSOR A: All of whom were resented, misunderstood, ostracized or killed. This is how human beings treat their geniuses.

Excerpt from THE WHOLE SHEBANG by Rich Orloff, reprinted with permission by Bret Adams Ltd., 448 West 44th Street, New York, NY 10036.

- 
35. Who are the professors and the student?
- (1) beings from some place other than Earth
  - (2) people at a university
  - (3) scientists working for the government
  - (4) international spies
  - (5) artists in a workshop
36. Why does the student say, “Thank you” (line 8)?
- because the professor
- (1) said he is cute
  - (2) returned his photograph
  - (3) complimented his creation of humans
  - (4) has assigned him an easy task
  - (5) has given him a good grade
37. What evidence does the student offer when the professor suggests he is exaggerating human intelligence?
- Humans
- (1) are learning more about the universe every day
  - (2) have created great works of art
  - (3) have invented tools
  - (4) have developed languages and produced literature
  - (5) have invented the sandwich
38. With which of the following statements would Professor A probably agree?
- (1) Beauty is in the eye of the beholder.
  - (2) Nothing is of value unless it is useful.
  - (3) Variety is the spice of life.
  - (4) I never met a man I didn’t like.
  - (5) Man’s reach should exceed his grasp.
39. What central message is the playwright conveying through the argument between the student and the professors?
- (1) Human beings are created equal.
  - (2) Other civilizations exist.
  - (3) The human race has both strengths and weaknesses.
  - (4) Professors are too hard on students.
  - (5) We must be tolerant of our differences.
40. Later Professor B says, “And what type of organism would let the Marx Brothers make only thirteen movies? They were easily good for another dozen.”
- Based on this information and the excerpt, how does Professor B compare with Professor A?
- Professor B is more
- (1) light-hearted
  - (2) defensive
  - (3) serious
  - (4) snobby
  - (5) accepting

**Answers and explanations start on page 623.**

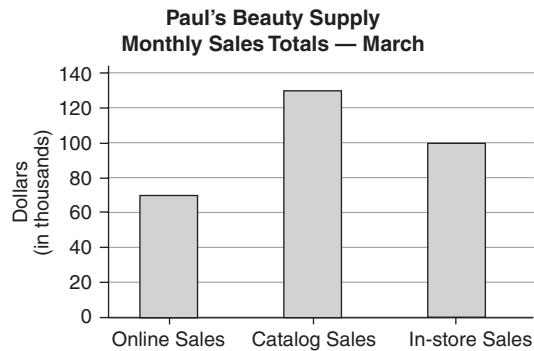
# GED MATH POST-TEST

## PART I

Write your answers on the answer sheet provided on page 593. A formulas page is provided on page 611.

**Directions:** You have 45 minutes to answer 25 questions in Part I of the Math Test. Choose the one best answer to each question. You MAY use your calculator.

Questions 1 and 2 refer to the following graph.



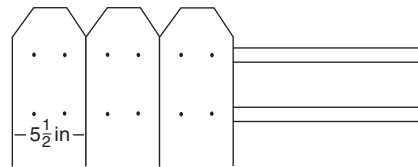
1. Customers of Paul's Beauty Supply can make purchases online, from a catalog, or in the store. About how much more did the company make from catalog sales than from online sales in March?

- (1) \$35,000
- (2) \$65,000
- (3) \$130,000
- (4) \$195,000
- (5) \$650,000

2. Approximately what fraction of the company's total sales came from in-store sales?

- (1)  $\frac{2}{3}$
- (2)  $\frac{1}{2}$
- (3)  $\frac{1}{3}$
- (4)  $\frac{1}{4}$
- (5)  $\frac{1}{6}$

3. John needs to replace the boards on a 22-foot section of his fence. He plans to place the boards as shown below.



If the boards are  $5\frac{1}{2}$  inches wide, how many boards should he buy to cover the distance?

- (1) 4
- (2) 33
- (3) 48
- (4) 66
- (5) 121

John Wright was capable of discouraging a person from singing, something that would have made that person happy.

3. (5) **They understand how someone could be driven to murder. (Synthesis)** The two women seem nervous and are evasive about the bird's death. But they are not protecting themselves. You can tell they suspect who might have murdered Wright and what might have driven the person to murder. References to "she," someone who liked to sing but stopped because of Wright ("He killed that, too"), someone who lived in loneliness and had only the bird as pleasure until the bird was killed indicate that the women suspect why this tragedy occurred.

#### Drama Practice Questions, pages 338–340

1. (3) **She will be forgiven for her misdeeds. (Comprehension)** Sadie says, "You don't understand. I've got to go back and be punished for what I've been," and "I've got to serve my time—then God will forgive me. It's the sacrifice I've got to offer up for the life I've led."
2. (2) **O'Hara thinks Sadie is making a mistake. (Analysis)** O'Hara wants Sadie to get dressed quickly so he can take her away and keep her from going to the penitentiary.
3. (4) **concern for Sadie's welfare (Synthesis)** You can draw this conclusion from O'Hara's lines and reactions throughout the scene. He cares about Sadie and doesn't want her to go to the penitentiary. He replies "brokenly" when she refuses his help.
4. (1) **argue with him (Application)** The fact that O'Hara tries forcibly to make Sadie go with him can be applied to what his reaction would be to the minister. He would most likely be angry enough to argue with Reverend Davidson to save Sadie.
5. (5) **tension (Analysis)** Stage directions indicate tense, wild, angry emotions, such as "She frees herself ferociously; turns on him angrily."
6. (1) **She wasn't perfect, but she worked hard for her children. (Analysis)** Bessie says all of the following: "I worked too hard all my years." "Or was Bessie Berger's children always the cleanest on the block?!" and "Here I'm not only the mother, but also the father. The first two years I worked in a stocking factory for six dollars while Myron Berger went to law school. If I didn't worry about the family who would?"
7. (3) **Life can be better. (Application)** Ralph exclaims that the life his mother had to lead isn't fair. He sees other possibilities and wants to change things: "Gimme the earth in two hands. I'm strong."
8. (2) **An old alarm clock can keep going, but not her aging body. (Analysis)** Bessie is growing older; she brought up her son and did the best she could. Soon her work will be done, and she doesn't have the energy to try to change the world: "A fire burned in my heart too, but now it's too late. I'm no spring chicken."
9. (3) **to get the work carving doors (Comprehension)** Fidel wants to learn about this job possibility by talking to Celestina. He knows he has to flatter her to get her to talk with him. Later he tells Berta, "Do you not realize what it means? They will need someone to carve the new doors."
10. (4) **She distrusts Fidel and fears he will hurt her. (Analysis)** Fidel explains he will carve the doors to buy a house for Berta. Fidel asks Berta, "Do you doubt me?" Berta replies that she does doubt him—just as a tree can't trust lightning not to strike it down.
11. (5) **dishonest (Expanded synthesis)** Berta is in love with Fidel but she is not being honest with him about her feelings in this scene.

## MATH ANSWERS AND EXPLANATIONS

### Math Basics

#### Lesson 1: Whole Number Review

##### Practice 1, page 347

- |        |            |
|--------|------------|
| 1. 4   | 9. 80      |
| 2. 8   | 10. 1100   |
| 3. 9   | 11. 12,000 |
| 4. 1   | 12. 2000   |
| 5. 6   | 13. 100    |
| 6. 7   | 14. 100    |
| 7. 3   | 15. 341    |
| 8. 500 | 16. 1145   |
17. 125,391  
18. 18, 23, 39, 45  
19. 89, 91, 109, 111  
20. 909, 932, 1087, 1139

21. 1420, 1425, 1429, 1432  
22. 11,098, 12,071, 12,131  
23. 15,298, 15,309, 15,356  
24. (4) **50, 48, 45, 40** Arrange weights from heaviest to lightest.  
25. (3) **1,500,000** The digit in the ten thousands column is less than 5, so round down.

#### Lesson 2: Operations Review

##### Practice 2.1, page 349

- |        |         |
|--------|---------|
| 1. 77  | 5. 190  |
| 2. 100 | 6. 4078 |
| 3. 52  | 7. 43   |
| 4. 36  | 8. 2117 |

- |         |             |
|---------|-------------|
| 9. 65   | 15. 2419    |
| 10. 114 | 16. 900     |
| 11. 180 | 17. 11,308  |
| 12. 293 | 18. 15,185  |
| 13. 483 | 19. 131,197 |
| 14. 456 | 20. 30,899  |

21. (3) **88**  
 $24 + 8 + 56 = 88$   
22. (3) **\$13**  
 $\$20 - \$7 = \$13$

##### Practice 2.2, page 351

- |         |        |
|---------|--------|
| 1. 484  | 4. 13  |
| 2. 1000 | 5. 105 |
| 3. 2736 | 6. 21  |

7. 1350                    14. 44 r3  
 8. 2625                    15. 300  
 9. 3376                    16. 200 r4  
 10. 28                      17. 150  
 11. 15                      18. 67,068  
 12. 6                        19. 538  
 13. 250                    20. 384

21. 12,011 r8  
 22. (4) 96  
 $16 \times 6 = 96$   
 23. (4) \$75  
 $15 \times \$5 = \$75$   
 24. (1) 6  
 $12 \div 2 = 6$

### Lesson 3: Distance and Cost Formulas

#### Practice 3, page 353

- rate;  $d/t = r$
- distance;  $d = rt$
- time;  $d/r = t$
- price per unit;  $c/n = r$
- cost;  $c = nr$
- number of units;  $c/r = n$
- \$48**  $c = nr$   
 $4 \times \$12 = \$48$
- \$36**  $c = nr$   
 $12 \times \$3 = \$36$
- \$80**  $c/n = r$   
 $\$320/4 = \$80$
- 5**  $c/r = n$   
 $\$25/\$5 = 5$
- \$2**  $c/n = r$   
 $\$20/10 = \$2$
- 180 miles**  $d = rt$   
 $60 \times 3 = 180$
- 200 miles**  $d = rt$   
 $50 \times 4 = 200$
- 1 hour**  $d/r = t$   
 $25/25 = 1$
- 90 miles per hour**  $d/t = r$   
 $270/3 = 90$
- 3 hours**  $d/r = t$   
 $75/25 = 3$
- (1) 32**  $c/r = n$   
 $\$640/\$20 = 32$
- (5) 55**  $d/t = r$   
 $275/5 = 55$

### Lesson 4: Calculators on the GED

#### Practice 4.1, page 355

- 153
- 1187
- 784
- 24
- 27,084
- 14,442
- 11,704

- 54
- 1580
- (2) 26,179**  
 $42,920 - 16,741 = 26,179$
- (5) \$19,900**  
 $\$995 \times 20 = \$19,900$

#### Practice 4.2, page 357

- 25
- 18
- 35
- 136
- 125
- 5%
- 2
- 135
- 5%
- (4) \$336**  
 $\$1680 \times 20\% = \$336$
- (1) 5%**  
 $\$48 \div \$960 = 5\%$

### Lesson 5: Filling in the Standard Grid

#### Practice 5, page 359

- 1740
- 10
- 994
- 15
- 2468
- 21

### Lesson 6: Problem Solving: Estimation

#### Practice 6, page 361

- 300 and 260
  - 5000 and 4700
  - 10,000 and 12,000
  - 300 and 330
  - 6000 and 6200
  - 20,000 and 23,000
- Your answers may vary.
- $36 \div 12$
  - $48 \div 8$
  - $45 \div 15$
  - $100 \div 20$
  - $360 \div 4$
  - $450 \div 9$  or  $480 \div 8$
  - (3) 90**  $7 + 65 + 19$  rounds to  $5 + 65 + 20 = 90$  minutes
  - (5) 1200**  $21 \times 55$  rounds to  $20 \times 60 = 1200$  pounds
  - (1) 8**  $78$  rounds to  $80 \div 10 = 8$  ounces
  - (4) 30**  $324 \div 11$  rounds to  $330 \div 11 = 30$  miles per gallon

### Lesson 7: Problem Solving: Set-Up Problems

#### Practice 7, page 363

- 46
- 13
- 39
- 10
- 15
- 70
- 11
- 30
- 4
- 2
- 6
- (3)**  $6 \times 8 \times 7$
- (5)**  $\$3 \times 2 \times 5$
- (4)**  $\frac{(\$25 + \$15)}{5}$
- (1)**  $\frac{\$78 - \$10}{7}$
- (5)**  $5(\$4 + \$1)$
- (1)**  $12 \times \$5$

### Math Basics Practice Questions, pages 364–367

#### Part I

- (5) 96** Multiply.  $12 \text{ servings} \times 8 \text{ ounces} = 96$
- (3) \$2092** Add to find the total.  $\$839 + \$527 + \$726 = \$2092$
- (1) 4** Divide the length of the sample board by the length of the brace you want.  $12\text{-foot board} \div 2\text{-feet per brace} = 6$  braces per board. Since you can get 6 braces from each board, divide the total number of braces you want by 6:  $24 \div 6 = 4$  boards
- (2) 21** Use the square root key on your calculator or multiply each answer option by itself to find 441.  $\sqrt{441} = 21$
- (2) 30,589** Subtract to find the difference in mileage.  $70,040 - 39,451 = 30,589$
- (3) \$656** You can use your calculator. Multiply.  $\$3280 \times 20\% = \$656$
- (1) \$5625** Multiply.  $\$125 \times 45 = \$5625$
- (3)  $7(\frac{180}{3})$**  Find the rate per hour: divide distance by time:  $\frac{180}{3}$ . Then multiply by the number of hours Lydia wants to travel:  $7(\frac{180}{3})$ .
- (4)  $\frac{480}{60}$**  Use the distance formula to find the time.  $d = rt$ , so  $t = \frac{d}{r}$  or  $\frac{480}{60}$
- (2) 96** Use the cost formula.  $c = nr$  or  $n = \frac{c}{r}$ . Divide the total cost by price per item to find the number of items.  $\$1440 \div 15 = \$96$

11. (1) **\$200** Multiply.  $\$25 \times 8 = \$200$
12. (5) **\$53** Multiply to find how many dollars each for \$5 bills and \$1 bills.  $7 \times \$5 = \$35$  and  $18 \times \$1 = \$18$  Then add the two amounts.  $\$35 + \$18 = \$53$
13. (5) **Not enough information is given.** Even though the manufacturer recommends changing the oil and filter every 3,500 miles, there is no way of knowing how closely April follows the recommendations.
14. (1) **134** Divide.  $536 \div 4 = 134$
15. **198** Subtract to find the difference.  $636 - 438 = 198$
16. **1072** Multiply the payment amount by the number of payments left.  $\$268 \times 4 = \$1072$

## Part II

17. (3) **51, 48, 44, 40** Compare the weights and order them from heaviest to lightest.
18. (4) **2,350,000** Since the digit to the right of the ten thousands place is less than 5, the digit in the ten thousands place remains the same.
19. (1) **83** Add.  $42 + 18 + 23 = 83$
20. (1) **\$6** Subtract.  $\$20 - \$14 = \$6$
21. (2) **60** Round the amounts and add.  
 $8 + 33 + 18 \approx 10 + 30 + 20 = 60$
22. (4)  $\frac{250}{4}$  Divide distance by time to find the rate of speed.  $250 \div 4$  can also be written as  $\frac{250}{4}$ .
23. (3) **18** Divide.  $144 \div 8 = 18$
24. (2) **30** Find a compatible pair and divide. Round 312 to 270 and divide.  $270 \div 9 = 30$  Or round 312 to 300 and 9 to 10.  $300 \div 10 = 30$
25. (4) **1200** Find a compatible pair and multiply. 33 rounds to 30, and 41 pounds rounds to 40.  $30 \times 40 = 1200$
26. (3) **\$9** Find the total and divide by 4.  $\$21 + \$15 = \$36$  Divide.  $\$36 \div 4 = \$9$
27. (4)  $\frac{\$84 - \$8}{9}$  Subtract the amount David paid from the total. Then divide the remaining amount by the number of people in the group.
28. (5) **260** Multiply rate by time.  $65 \times 4 = 260$
29. (2) **\$18** Add the cost of a

1-topping pizza and \$2 for each of the 2 additional toppings.  $\$14 + \$2 + \$2 = \$18$

30. (4) **14** Multiply by 2 for each dollar.  $2 \times 7 = 14$
31. **24** Divide the total amount by the amount paid per month.  $\$1800 \div \$75 = 24$
32. **14** Divide the maximum capacity by the number of pages per document.  $630 \div 45 = 14$

## Decimals and Fractions

### Lesson 1: Decimal Basics

#### Practice 1, page 369

- |          |           |
|----------|-----------|
| 1. 3.8   | 7. 0.45   |
| 2. 6     | 8. 0.08   |
| 3. 0.43  | 9. 4.68   |
| 4. 0.667 | 10. 1.85  |
| 5. 8.1   | 11. 1.029 |
| 6. 2.714 | 12. 0.14  |
13. 5.08, 5.6, 5.8, 5.802
14. 0.1136, 0.115, 0.12, 0.2
15. 4.52, 4.667, 4.8, 14.005
16. 0.8, 0.8023, 0.803, 0.823
17. (4) **0.6 g, 0.572 g, 0.0785 g** Since none of the weights has a whole number part, compare the tenths places, then the hundredths places.
18. (5) **1.38** Only options (2) and (5) are rounded to the hundredths place. Since the number in the thousandths place is less than 5, round down.

### Lesson 2: Decimal Operations

#### Practice 2.1, page 371

- |           |            |
|-----------|------------|
| 1. 7.996  | 13. 5.506  |
| 2. 10.508 | 14. 21.16  |
| 3. 12.26  | 15. 0.645  |
| 4. 5.85   | 16. 2.426  |
| 5. 7.426  | 17. 0.15   |
| 6. 2.11   | 18. 4.88   |
| 7. 18.094 | 19. 11.8   |
| 8. 5.117  | 20. 14.016 |
| 9. 21.32  | 21. 4.522  |
| 10. 0.895 | 22. 2.36   |
| 11. 3.84  | 23. 17.88  |
| 12. 2.35  | 24. 17.225 |
25. (2) **22.25** Add the times:  $7.2 + 6.8 + 8.25 = 22.25$  minutes. You do not need to use the 3-mile distance to solve the problem.
26. (4) **4.25** Add to find Claudia's total hours for the week:  $8.5 +$

$9.25 + 8.75 + 10 + 7.75 = 44.25$ . Then subtract 40 to find the number of overtime hours:  $44.25 - 40 = 4.25$  hours.

27. (1) **1.8** Add the lengths cut from the pipe:  $2.8 + 1.4 = 4.2$ , and subtract from 6:  $6 - 4.2 = 1.8$  meters.
28. (4) **\$55.26** Add the amounts.  $\$16.98 + \$31.78 + \$6.50 = \$55.26$

### Practice 2.2, page 373

- |           |            |
|-----------|------------|
| 1. 2.65   | 12. 15,800 |
| 2. 12.8   | 13. 34.1   |
| 3. 0.496  | 14. 2.36   |
| 4. 0.52   | 15. 0.656  |
| 5. 3.6    | 16. 2.64   |
| 6. 4.09   | 17. 1.65   |
| 7. 8.75   | 18. 4.275  |
| 8. 3.375  | 19. 3.696  |
| 9. 9.6681 | 20. 1.002  |
| 10. 24    | 21. 0.0072 |
| 11. 14.2  |            |
22. (5) **15.16** Multiply 3.79 liters by 4.  $3.79 \times 4 = 15.16$  liters
23. (2) **\$9.23** Multiply  $\$0.45 \times 20.5$ :  $\$0.45 \times 20.5 = \$9.225$ , which rounds to \$9.23.
24. (3) **92.9** Divide to find the average daily miles:  $278.7 \div 3 = 92.9$  miles.
25. (4) **\$0.26** Read the table. There are 19 servings in a box of Toasted Oats. Divide:  $\$4.94 \div 19 = \$0.26$ .
26. (2) **50.0** Find the weight in the table and multiply:  $12.5 \times 4 = 50$  ounces.

### Lesson 3: Fraction Basics

#### Practice 3, page 375

- |                                       |                      |
|---------------------------------------|----------------------|
| 1. $\frac{3}{5}$                      | 14. $\frac{7}{4}$    |
| 2. $\frac{2}{4}$ , or $\frac{1}{2}$   | 15. $4\frac{5}{7}$   |
| 3. $\frac{2}{3}$                      | 16. $\frac{57}{10}$  |
| 4. $\frac{7}{3}$ , or $2\frac{1}{3}$  | 17. $\frac{12}{16}$  |
| 5. $\frac{7}{2}$ , or $3\frac{1}{2}$  | 18. $\frac{7}{21}$   |
| 6. $\frac{15}{4}$ , or $3\frac{3}{4}$ | 19. $\frac{48}{60}$  |
| 7. $5\frac{2}{3}$                     | 20. $\frac{15}{40}$  |
| 8. $\frac{18}{5}$                     | 21. $\frac{24}{100}$ |
| 9. 4                                  | 22. $\frac{3}{4}$    |
| 10. $\frac{47}{9}$                    | 23. $\frac{1}{6}$    |
| 11. $4\frac{3}{4}$                    | 24. $\frac{3}{5}$    |
| 12. $\frac{29}{12}$                   | 25. $\frac{13}{15}$  |
| 13. $4\frac{7}{9}$                    | 26. $\frac{2}{3}$    |



27. (1)  $\frac{3}{4}$  Of those surveyed,  $\frac{18}{24}$  went to at least one movie. Reduce the fraction to lowest terms.  
 $\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$
28. (3)  $\frac{40}{100}$  Raise  $\frac{2}{5}$  to an equivalent fraction with a denominator of 100 by multiplying both numbers by 20.  $\frac{2 \times 20}{5 \times 20} = \frac{40}{100}$

#### Lesson 4: Fraction Operations

##### Practice 4.1, page 377

- |                      |                       |
|----------------------|-----------------------|
| 1. $\frac{1}{2}$     | 14. $7\frac{13}{18}$  |
| 2. 1                 | 15. $12\frac{17}{30}$ |
| 3. $\frac{1}{3}$     | 16. $2\frac{5}{8}$    |
| 4. $\frac{1}{6}$     | 17. $42\frac{5}{12}$  |
| 5. $\frac{11}{12}$   | 18. $22\frac{11}{20}$ |
| 6. $1\frac{1}{8}$    | 19. $5\frac{1}{18}$   |
| 7. $\frac{3}{10}$    | 20. $11\frac{1}{8}$   |
| 8. $\frac{5}{18}$    | 21. $3\frac{23}{28}$  |
| 9. $3\frac{13}{15}$  | 22. $1\frac{7}{24}$   |
| 10. $1\frac{3}{4}$   | 23. $2\frac{3}{7}$    |
| 11. $8\frac{1}{2}$   | 24. $8\frac{8}{9}$    |
| 12. $11\frac{5}{8}$  | 25. $\frac{32}{35}$   |
| 13. $21\frac{7}{10}$ |                       |
26. (3)  $1\frac{3}{16}$  Add to find the total.  
 $\frac{5}{16} + \frac{7}{8} = \frac{5}{16} + \frac{14}{16} = \frac{19}{16} = 1\frac{3}{16}$  inches
27. (3)  $1\frac{5}{8}$  Subtract to find the difference in the lengths.  
 $2\frac{7}{8} - 1\frac{1}{4} = 2\frac{7}{8} - 1\frac{2}{8} = 1\frac{5}{8}$  inches
28. (1)  $14\frac{3}{8}$  Subtract the amount sold from the amount on the bolt:  
 $23\frac{1}{4} - 8\frac{7}{8} = 23\frac{2}{8} - 8\frac{7}{8}$   
 $= 22\frac{10}{8} - 8\frac{7}{8} = 14\frac{3}{8}$  yards.
29. (4)  $2\frac{11}{12}$  Add the amounts.  
 $1\frac{2}{3} + \frac{1}{2} + \frac{3}{4} = 1\frac{8}{12} + \frac{6}{12} + \frac{9}{12} =$   
 $1\frac{23}{12} = 2\frac{11}{12}$  cups

##### Practice 4.2, page 379

- |                     |                    |
|---------------------|--------------------|
| 1. $\frac{1}{6}$    | 10. 14             |
| 2. $\frac{11}{12}$  | 11. $1\frac{4}{5}$ |
| 3. 14               | 12. 48             |
| 4. $18\frac{3}{4}$  | 13. $2\frac{2}{5}$ |
| 5. $\frac{7}{8}$    | 14. $2\frac{1}{4}$ |
| 6. $2\frac{5}{32}$  | 15. 27             |
| 7. $7\frac{14}{15}$ | 16. 8              |
| 8. $41\frac{1}{4}$  | 17. $9\frac{1}{2}$ |
| 9. $2\frac{1}{32}$  | 18. $\frac{3}{4}$  |

19. (3) 75 Find  $\frac{3}{16}$  of 400. Multiply.

$$400 \times \frac{3}{16} = \frac{400}{1} \times \frac{3}{16} = \frac{75}{1} = 75$$

20. (2) 7 Divide.

$$20 \div 2\frac{3}{4} = \frac{20}{1} \div \frac{11}{4} =$$

$$\frac{20}{1} \times \frac{4}{11} = \frac{80}{11} = 7\frac{3}{11}$$

Ignore the remainder since the problem asks how many shirts can be completed.

21. (3) 33 You need to find how many  $\frac{2}{3}$  hours there are in 22 hours. Divide.

$$22 \div \frac{2}{3} = \frac{22}{1} \div \frac{2}{3} =$$

$$\frac{22}{1} \times \frac{3}{2} = \frac{22}{1} \times \frac{3}{2} = \frac{33}{1} = 33$$

22. (4)  $37\frac{7}{8}$  Multiply  $12\frac{5}{8}$  inches by 3, the number of panels.

$$12\frac{5}{8} \times 3 = \frac{101}{8} \times \frac{3}{1} = \frac{303}{8} = 37\frac{7}{8}$$

#### Lesson 5: Solving Problems Using a Calculator

##### Practice 5, page 381

- 7.379
- $2\frac{1}{4}$
- \$380.10** The calculator display shows [ 380.1]. To write the cents with two decimal places, add a zero.
- 42
- \$84.44** Multiply.  $\$95 \times \frac{8}{9} = 84.444 = \$84.44$ .
- \$79.74** Divide.  $\$956.88 \div 12 = \$79.74$
- 15 pieces** Divide.  $20\frac{5}{8} \div 1\frac{3}{8} = 15$  pieces
- \$1,475** Multiply.  $\$118,000 \times 0.0125 = \$1,475$
- 4 $\frac{1}{4}$  cups** Add.  $1\frac{1}{2} + 2\frac{3}{4} = 4\frac{1}{4}$  cups
- (4) **\$194.97** Multiply the cost of a twin quilt by 2 and add the cost of a king-sized quilt.  $(\$49.99 \times 2) + \$94.99 = \$194.97$
- (3) **\$6.67** Multiply the weight of a queen-sized quilt by \$1.20:  $5.56 \times \$1.20 = \$6.672$ , which rounds to \$6.67
- (5)  $\frac{5}{12}$  Think of her take-home pay as 1 whole. Subtract the fractions from the whole.  
 $1 - \frac{1}{3} - \frac{1}{4} = \frac{5}{12}$  Another approach is to add the fractions:  $\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$ , and subtract this total from 1.  
 $1 - \frac{7}{12} = \frac{5}{12}$
- (3) **24** You need to find  $\frac{3}{8}$  of 64. Multiply.  $64 \times \frac{3}{8} = 24$  acres

#### Lesson 6: Filling in the Answer Grid

##### Practice 6, page 383

Your answers may begin in a different column. You may align your answer on the left or the right, or you may center your answer.

- 35.6** Add the amounts from the problem.
- $\frac{2}{3} \frac{\$100}{\$150}$  reduces to  $\frac{2}{3}$ .

3	5	.	6	
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

2	/	3	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

- $\frac{7}{4}$  or **1.75** Subtract  $7\frac{3}{4}$  from  $9\frac{1}{4}$ . The difference is  $1\frac{7}{4}$ , which equals  $\frac{7}{4}$ . Remember, you must enter mixed numbers as either improper fractions or decimals.
- 38** Divide 100 by 2.6. You get 38.4615, but you would be able to fill only 38 bottles.

7	/	4	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3	8		
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

- $\frac{1}{6}$  The fraction  $\frac{3}{18}$  reduces to  $\frac{1}{6}$ .
- 25** Divide 12.5 by 0.5.

1	/	6	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2	5		
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9



## Lesson 7: Problem Solving Fraction and Decimal Equivalencies

### Practice 7: page 385

- (2) **\$20.00** Instead of multiplying \$80 by 0.25, find  $\frac{1}{4}$  of 80.
- (4) **480 × 0.3** Find  $\frac{3}{10}$  of 480. In this case, "of" indicates multiplication, and the decimal equivalent of  $\frac{3}{10}$  is 0.3.
- (2) **4 $\frac{2}{3}$**  The decimal part of the calculator display equals the fraction  $\frac{2}{3}$ .
- (4) **\$18.00** Multiply 12 by 1.5. The decimal 1.5 =  $1\frac{1}{2}$ . You may be able to find  $1\frac{1}{2}$  of \$12 mentally: \$12 + \$6 (half of \$12) = \$18.
- (2)  **$\frac{3}{4}$**  Subtract.  $1.875 - 1.125 = 0.75$ , which equals  $\frac{3}{4}$  inch.
- (3) **0.375** Instead of dividing 3 by 8, think:  $3 \div 8$  means  $\frac{3}{8}$ , which equals 0.375.

### Decimals and Fractions Practice Questions, pages 386–389

#### Part I

- (4) **15 $\frac{3}{4}$**  Subtract.  
 $20\frac{1}{2} - 4\frac{3}{4} = 20\frac{2}{4} - 4\frac{3}{4} = 19\frac{6}{4} - 4\frac{3}{4} = 15\frac{3}{4}$
- (2) **\$0.25** Divide the cost by the number of servings.  
 $\$4.69 \div 19 \approx 0.246$ , which rounds to \$0.25.
- (3) **\$1386.20** To find the amount the 12-month plan will cost a customer, multiply \$98.85 by 12 and add \$200.  
 $(\$98.85 \times 12) + \$200 = \$1386.20$
- (3) **\$15.42** Multiply using your calculator. Use 10.5 for  $10\frac{1}{2}$ .  
 $\$1.469 \times 10.5 = \$15.4245$ , which rounds to \$15.42.
- (2) **2.85** Since the answer choices are decimals, use your calculator. Use decimals instead of fractions:  $1\frac{1}{2} = 1.5$ ,  $4\frac{3}{4} = 4.75$ , and  $2\frac{3}{10} = 2.3$ . To find the average, add the three weights and divide the total by 3.  
 $\frac{1.5 + 4.75 + 2.3}{3} = \frac{8.55}{3} = 2.85$
- (4) **32 $\frac{1}{4}$**  Divide.  $\$258 \div \$8 = 32.25$ , which equals  $32\frac{1}{4}$
- (3) **57** Subtract  $6\frac{1}{4}$  from  $20\frac{1}{2}$  and divide the difference by  $\frac{1}{4}$ . To do the work quickly, use the fraction keys on your calculator or

change the fractions to decimals.

$$20\frac{1}{2} - 6\frac{1}{4} = 14\frac{1}{4}$$

$$14\frac{1}{4} \div \frac{1}{4} = 57$$

- (4) **\$90.00** Brand B costs \$0.09 more than Brand A, so the school will save \$0.09 on each marker. Multiply the savings by 1000.  $\$0.09 \times 1000 = \$90.00$
- (2) **3 $\frac{1}{2}$**  Add the times for the appointments.  
 $\frac{3}{4} + \frac{3}{4} + 1\frac{1}{4} + \frac{3}{4} = 1\frac{10}{4} = 3\frac{2}{4} = 3\frac{1}{2}$
- (4) **10** Divide  $3\frac{1}{2}$  hours by the amount of time needed for a routine physical.  
 $3\frac{1}{2} \div \frac{1}{3} = \frac{7}{2} \div \frac{1}{3} = \frac{7}{2} \times \frac{3}{1} = \frac{21}{2} = 10\frac{1}{2}$   
Jennifer can complete 10 physicals. Ignore the fraction remainder.

- (5)  **$\frac{11}{12}$**  Write the fraction and reduce it to lowest terms. You can save time by using the fraction key on your calculator, which automatically reduces a fraction to lowest terms.  
Enter 5500  $\left(\frac{a}{b}/c\right)$  6000  $\left(= \right)$   $\left(\frac{11}{12}\right)$  which represents  $\frac{11}{12}$ .

- (3) **\$7.25** The first hour costs \$3.50, and there are  $1\frac{1}{2}$  hours left. There are 3 half hours in  $1\frac{1}{2}$  hours, so you will pay  $\$3.50 + (3 \times \$1.25) = \$7.25$ .

- $\frac{2}{3}$  Write a fraction and reduce.  
 $\frac{56}{84} = \frac{2}{3}$

2	/	3
0	0	0
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

- 0.84** Subtract to compare.  
 $3.97 - 3.13 = 0.84$

.	8	4
0	0	0
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

#### Part II

- (2)  **$\frac{3}{10}$**  Subtract.  $250 - 175 = 75$   
Thus, 75 out of 250, or  $\frac{75}{250}$  have not been loaded. Reduce.  
 $\frac{75 \div 25}{250 \div 25} = \frac{3}{10}$
- (5) **(12 × \$8.90) + (15 × \$7.50)** Multiply the wage for each job by the hours for that job; then add the results.
- (1) **285** To find  $\frac{3}{4}$  of 380, multiply. Change  $\frac{3}{4}$  to .75.  $380 \times .75 = 285$
- (4)  **$\frac{5}{6}$**  To find half of  $1\frac{2}{3}$ , either multiply by  $\frac{1}{2}$  or divide by 2. Both results are the same.  
 $1\frac{2}{3} \times \frac{1}{2} = \frac{5}{3} \times \frac{1}{2} = \frac{5}{6}$
- (5) **core box, classic, bevel, cutter** You could change the fractions to decimals to solve the problem, but the quickest method is to rewrite the fractions with a common denominator of 32:  
cutter:  $\frac{9}{16} = \frac{18}{32}$   
core box:  $\frac{5}{32}$   
classic:  $\frac{3}{8} = \frac{12}{32}$   
bevel:  $\frac{1}{2} = \frac{16}{32}$   
Then arrange the like fractions from least to greatest by their numerators.
- (2) **50 - (2 × 12.75)** You need to subtract 12.75 from 50 twice. Only option (2) multiplies 12.75 by 2 and then subtracts the result from 50.
- (4) **8** Divide.  $60 \div 7.5 = 8$  days
- (4) **150** You need to find  $\frac{5}{8}$  of 240. Multiply.  
 $240 \times \frac{5}{8} = \frac{240}{1} \times \frac{5}{8} = \frac{150}{1} = 150$
- (2)  **$\frac{1}{2}$**  Multiply.  
 $\frac{2}{3} \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{4} = \frac{1}{2}$
- (2) **56** Multiply.  
 $140 \times \frac{2}{5} = \frac{140}{1} \times \frac{2}{5} = \frac{56}{1} = 56$
- (4) **17.9** Maya travels five segments of the route. Add to find the total distance.  
 $2.4 + 4.3 + 3.6 + 3.6 + 4.0 = 17.9$
- (5) **5** Add to find the total amount to be cut off.  
 $3\frac{3}{4} + 3\frac{3}{4} = 6\frac{6}{4} = 7\frac{1}{2}$   
Subtract from  $12\frac{1}{2}$ .  
 $12\frac{1}{2} - 7\frac{1}{2} = 5$
- (2) **\$535.60** Multiply \$26.38 by 20 and add \$8 to the result.



7. 17 Since  $33\frac{1}{3}\% = \frac{1}{3}$ , you can multiply by  $\frac{1}{3}$  or divide by 3 to solve the problem.
8. \$60
9. 200%
10. 5%
11. 8%
12. \$3.91
13.  $6\frac{1}{2}\%$  or 6.5%
14. \$364
15. 62.5% or  $62\frac{1}{2}\%$
16. 72
17. (4)  $60\% \ 72 \div 120 = 0.6 = 60\%$
18. (3) **\$2,385**  $\$2,250 \times 0.06 = \$135$ , and  $\$2,250 + \$135 = \$2,385$
19. (5) **\$46 × 0.15**  
 $15\% = 0.15$   
 Multiply the base (\$46) by the rate (0.15) to find the part.
20. (4) **70%** Find what percent \$45.50 is of \$65 by dividing.  $\$45.50 \div \$65 = 0.7$ , which equals 70%.
21. (1)  $\frac{\$3 \div 100}{\$50}$  You need to divide the part (\$3) by the whole (\$50) to find the rate; however, option (4) states  $\$3 \div \$50$  equals 0.06. You still need to change 0.06 to a percent, which you can do by multiplying by 100. If you write a proportion to solve the problem, you will easily see that option (1) is the correct choice.

### Practice 3.2, page 399

- |            |            |
|------------|------------|
| 1. \$175   | 10. 25%    |
| 2. 280     | 11. \$75   |
| 3. 6.4     | 12. \$9.30 |
| 4. \$200   | 13. 900    |
| 5. 30      | 14. 90%    |
| 6. \$84    | 15. \$780  |
| 7. 200     | 16. \$3120 |
| 8. 9       | 17. 4000   |
| 9. \$13.50 | 18. 10%    |
19. (3) **\$1,230.00** Solve for the base.  $\frac{\$369}{0.3} = \$1,230$
20. (4) **\$1,200,000** Solve for the base.  $\frac{\$72,000}{0.06} = \$1,200,000$
21. (2)  $\frac{160 \times 100}{x}$  Set up the problem as a proportion.  $\frac{160}{x} = \frac{5}{100}$  To solve the proportion, you would multiply  $160 \times 100$  and divide by 5. Only option (2) carries out those operations.
22. (4) **3600 × 0.2** The base is 3600, the total number who received the application. The part is the

unknown number who returned the application. Since  $20\% = 0.2$ , you can solve for part by multiplying the base by the rate.  
 $3600 \times 0.2$

### Lesson 4: Solving Problems Using a Calculator

#### Practice 4, page 401

- |            |                              |
|------------|------------------------------|
| 1. \$59.80 | 10. 79                       |
| 2. \$96    | 11. 2.5% or $2\frac{1}{2}\%$ |
| 3. \$15.12 | 12. 48                       |
| 4. 40      | 13. 78%                      |
| 5. 3%      | 14. \$16                     |
| 6. 2080    | 15. 250                      |
| 7. 25%     | 16. 14                       |
| 8. 70      | 17. 7%                       |
| 9. 25.2    | 18. 276                      |
19. (4) **\$8.20** Chanel's order falls between \$50.01 and \$100. Find 5% of \$84. Press:  $84 \times 5$  (SHIFT) (%). The display reads 4.2. Add \$4.  $\$4.20 + \$4 = \$8.20$
20. (1) **\$0.30** Find the shipping and handling for Jason's order: 8% of \$110 = \$8.80. Find the shipping and handling for Zola's order. 5% of \$90 = \$4.50, and  $\$4.50 + \$4.00 = \$8.50$  Find the difference.  $\$8.80 - \$8.50 = \$0.30$
21. (3) **88%** Press:  $3190 \div 3625$  (SHIFT) (%). The display reads 88.
22. (5) **15%** Divide strikeouts (63) by at bats (410) and change to percent. Press:  $63 \div 410$  (SHIFT) (%). The display reads 15.36585366, which rounds to 15%.

### Lesson 5: Simple Interest

#### Practice 5, page 403

- \$360
- \$56
- \$420
- \$480
- \$1137.50
- \$1998 8 months =  $\frac{2}{3}$  year
- \$1700
- (5) **\$1300 + (\$1300 × 0.09 × 1.5)** Find the interest by multiplying the amount borrowed (\$1300) by the time period in years (1.5) by

the interest expressed as a decimal (0.09). To find the amount paid back, the amount borrowed must be added to the interest. Only option (5) shows this series of operations.

9. (1) **\$5200** Multiply.  
 $\$8000 \times 0.13 \times 5 = \$5200$
10. (3) **\$1545** Find the amount of interest. For the time period, use  $\frac{9}{12}$  months, which equals  $\frac{3}{4}$ , or 0.75. Multiply.  $\$1500 \times 0.04 \times 0.75 = \$45$  Add to find the amount paid back.  
 $\$1500 + \$45 = \$1545$
11. (3) **\$144** Find the interest for each loan option. Option A:  $\$2400 \times 0.12 \times 2.5 = \$720$   
 Option C:  $\$2400 \times 0.09 \times 4 = \$864$  Subtract to find the difference.  $\$864 - \$720 = \$144$
12. (5) **\$3640** Find the interest she will owe.  $\$2800 \times 0.1 \times 3 = \$840$  Add to find the amount she will pay back.  $\$2800 + \$840 = \$3640$

### Lesson 6: Percent of Change

#### Practice 6, page 405

- |                               |         |
|-------------------------------|---------|
| 1. 50%                        | 6. 32%  |
| 2. 37.5% or $37\frac{1}{2}\%$ | 7. 21%  |
| 3. 200%                       | 8. 86%  |
| 4. 45%                        | 9. 420% |
| 5. 20%                        | 10. 34% |
11. (3) **60%** Subtract.  $\$448 - \$280 = \$168$  Divide by the original weekly pay.  $\$168 \div \$280 = 0.6$ , which equals 60%.
12. (2) **25%** Subtract.  $\$48 - \$36 = \$12$  Divide by the original price.  $\$12 \div \$48 = 0.25$ , which equals 25%.
13. (4) **6%** Subtract.  $\$636 - \$600 = \$36$  Divide by the original rent.  $\$36 \div \$600 = 0.06$ , which equals 6%.
14. (4) **125%** The wholesale price of the model is \$63, and the retail price is \$141.75. Subtract.  $\$141.75 - \$63 = \$78.75$  Divide by the wholesale price.  $\$78.75 \div \$63 = 1.25$ , which equals 125%.
15. (2) **30%** The retail price of the model is \$150.50, and the member's price is \$105.35. Subtract.  $\$150.50 - \$105.35 = \$45.15$  Divide by the retail price.  $\$45.15 \div \$150.50 = 0.3$ , which equals 30%.

## Lesson 7: Problem Solving

### Practice 7, page 407

- (3) 33% The number of species affected by road construction is 95. The total number identified (286) is found in the paragraph before the table.  $95 \div 286 \approx 0.332 = 33.2\%$ , which rounds to 33%.
- (4)  $\frac{8}{5}$  The number affected by logging is 24, and the number affected by disease is 15. Write the ratio and simplify.  $\frac{24}{15} = \frac{8}{5}$
- (5) **Not enough information is given.** The total number affected by air, water, and soil pollution is 44. You have no way to find the number affected by water pollution only.
- (3) \$13.55 The discount on the ladder is 30%.  $\$32.50 \times 0.3 = \$9.75$  The price of two cans of paint is  $\$19 \times 2 = \$38$ . At 10% off, the discount on the paint is  $\$38 \times 0.1 = \$3.80$ . The total discount is  $\$9.75 + \$3.80 = \$13.55$ .
- (5) **Not enough information is given.** The discount information does not show the price of either the paint or the brushes.
- (4) 3:1 The distance to Niagara Falls (95 miles) is about three times the distance to Finger Lakes (31 miles). The best choice is option (4).

### Ratio, Proportion, and Percent Practice Questions, pages 408–411

#### Part I

- (4) 1:11 Subtract to find the dollars spent on other costs.  $\$360,000 - \$30,000 = \$330,000$   
Write a ratio and reduce.  
 $\frac{\$30,000}{\$330,000} = \frac{1}{11}$
- (1)  $\frac{2 \times 50}{5}$  Write a proportion.  $\frac{5}{2} = \frac{50}{x}$  To solve it, you need to multiply  $2 \times 50$  and divide by 5. Only option (1) performs these operations.
- (2) \$7.56 Find 35% of \$5.60.  $\$5.60 \times 0.35 = \$1.96$  Add.  $\$1.96 + \$5.60 = \$7.56$  Another way to get the answer is to find 135% of \$5.60.  $\$5.60 \times 1.35 = \$7.56$
- (4) \$20,000 The current worth of the car (\$12,000) is part of the base. Solve for base.  $\$12,000 \div 0.6 = \$20,000$

- (4) 42 Solve the proportion  $\frac{7}{3} = \frac{x}{18}$ .  $7 \times 18 \div 3 = 42$
- (1) 6% The commission is part of the base. Solve for part.  $\$954 \div \$15,900 = 0.06 = 6\%$
- (2) 1:6 Add to find the total time spent on the project.  $2 + 1\frac{1}{2} + 2 + 3\frac{1}{2} = 9$  hours  
Write a ratio using decimals and reduce.  $\frac{1.5 \div 1.5}{9 \div 1.5} = \frac{1}{6}$
- (3) 36% Add to find the acres used for grains, vegetables, or fruits.  $5,200 + 9,200 = 14,400$   
Solve for percent.  $14,400 \div 40,000 = 0.36 = 36\%$
- (5) **Not enough information is given.** You can find the total farmland acreage for last year, but you cannot find the number of acres used for dairy production. Without that number, you cannot find the percent.
- (1)  $\frac{3}{16}$  The total fat is  $3 + 13 = 16$  grams. Write the ratio of saturated fat (3 grams) to the total (16 grams). The ratio cannot be simplified.
- (2) 10 Write a proportion and solve.  $\frac{4}{5} = \frac{x}{12.5}$   
 $4 \times 12.5 \div 5 = 10$  inches
- 138 Write a proportion and solve.  $\frac{4}{3} = \frac{184}{x}$ , and  $3 \times 184 \div 4 = 138$  female patients

1	3	8	
7	7	7	
0	0	0	0
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

- \$900 If 20% is the amount of the discount, then the sale price must be 80% of the original price. The sale price is the part, and the original price is the base. Solve for base.  $\$720 \div 0.8 = \$900$   
Grid in the amount without the dollar sign.

9	0	0	
7	7	7	
0	0	0	0
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

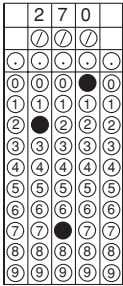
#### Part II

- (2) 40 If the ratio of wins to losses is 5:4, then the ratio of wins to games played is 5:9. Write a proportion and solve.  $\frac{5}{9} = \frac{x}{72}$   $5 \times 72 \div 9 = 40$  games won
- (3) 192 Add to find the number that did not answer "no."  $16\% + 32\% = 48\%$  Find 48% of 400.  $400 \times 0.48 = 192$
- (5)  $\frac{\$24 - \$19}{\$24} \times 100$  To find the percent of decrease, you subtract the lower price from the higher price and divide the difference by the original price. In this case, the original price is \$24, the higher price. To change the answer to a percent, you must move the decimal point two places to the right or multiply by 100. Only option (5) shows this series of operations.
- (1) 121 When the rate is greater than 100%, the part will be greater than the base. Solve for the part.  $55 \times 2.2 = 121$
- (4) 18% There are 6 grams of fat in the roast beef sandwich:  $6 \times 9 = 54$  calories in the sandwich from fat. The total calories in the sandwich is 300. Find what percent 54 is of 300.  $54 \div 300 = 0.18 = 18\%$
- (5) \$264 Write a proportion and solve.  $\frac{\$8}{\$3} = \frac{\$704}{x}$   
 $\$3 \times \$704 \div \$8 = \$264$
- (3) 175 The 140 employees who have more than 12 days of sick leave are part of the whole workforce. You need to solve for the base.  $140 \div 0.8 = 175$
- (5) 825 If the ratio of sold to unsold tickets is 11 to 1, then the ratio of sold to total tickets is 11 to 12. Write a proportion and solve.  $\frac{11}{12} = \frac{x}{900}$   
 $11 \times 900 \div 12 = 825$
- (4) \$2464 Use the formula for finding simple interest:  $i = prt$ .  $\$2200 \times 0.08 \times 1.5 = \$264$  To find the amount in the account at the end of the time, add the interest to the original investment.  $\$2200 + \$264 = \$2464$
- (1) \$410 - (\$410  $\times$  0.2) Once you find the discount by multiplying 0.2 by \$410, you will need to subtract the discount

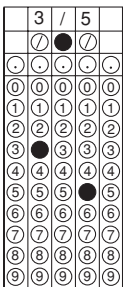


from \$410 to find the sale price. Only option (1) shows this sequence of operations.

24. **(5) 330** After changing  $2\frac{3}{4}$  to the decimal 2.75, write a proportion and solve.  $\frac{0.5}{60} = \frac{2.75}{x}$   
 $60 \times 2.75 \div 0.5 = 330$
25. **(3) (140 - 91)/140 \times 100** There were 140 customers on Sunday, and 91 made a purchase. Therefore, 140 - 91 did not make a purchase. To find the percent rate, divide the difference by 140, the total number of customers on Sunday (the base). Then move the decimal point two places to the right or multiply by 100 to change the answer to a percent. Only option (3) shows this sequence of operations.
26. **270** Write a proportion and solve.  $\frac{9}{14} = \frac{x}{420}$ , and  
 $9 \times 420 \div 14 = 270$



27.  $\frac{3}{5}$  If she spends 15 hours answering telephones, she spends 40 - 15, or 25 hours doing other tasks. Write a ratio and reduce.  $\frac{15}{25} = \frac{3}{5}$



## Data Analysis

### Lesson 1: Tables and Pictographs

#### Practice 1, page 413

- 9
- 6%
- 300

- 3000
- (5) Not enough information is given.** The problem is asking you to find the part, but the table gives only the rate. You have to know two elements of a percent problem in order to solve for the third element.
- (3) 84** In 2000, 24% of 3-year-old children could write their own names. Find 24% of 350.  $350 \times 0.24 = 84$
- (3) 375** There are  $7\frac{1}{2}$  car symbols. Each symbol represents 50 cars. Multiply.  $7\frac{1}{2} \times 50 = 375$
- (1) 75** Compare the symbols for the two rows. There are  $1\frac{1}{2}$  more symbols for 8 A.M. to noon than for times after 4:30 P.M. Multiply.  $1\frac{1}{2} \times 50 = 75$

### Lesson 2: Bar and Line Graphs

#### Practice 2.1, page 415

- 50
- about 15
- 20%
- about \$20 million
- Film A
- 150%
- (3) 41** Estimate the values of the bars labeled CDs, Videos, and DVDs. CDs  $\approx$  112, Videos  $\approx$  42, and DVDs  $\approx$  29. Add the values for Videos and DVDs.  $42 + 29 = 71$  Subtract this from the value for CDs.  $112 - 71 = 41$  You may have chosen different numbers. Even if your result is different, the closest answer choice should be choice (3).
- (4) \$1000** There were about 50 games sold, so 25 sold for \$16 and 25 sold for \$24.  $(25 \times \$16) + (25 \times \$24) = \$1000$
- (4) 14:3** Write a ratio and simplify.  $\frac{70}{15} = \frac{14}{3}$
- (5) September** Add the 2-day and 5-day permits for each month. Only September's permits equal 80.  $60 + 20 = 80$  permits

#### Practice 2.2, page 417

- September
- 270
- from June to July
- \$10
- 20%
- \$30

- (1) 1930 to 1940** The price of goods decreased over two decades, 1920 to 1940. Note the downward movement of the line. Only the time period 1930 to 1940 is included among the answer options.
- (4)  $\frac{1}{5}$**  The price of the same goods was about \$20 in 1970 and \$100 in 2000. Write a ratio and simplify.  $\frac{\$20}{\$100} = \frac{1}{5}$
- (2) 50** There were 390 sales in Store 2 and 340 sales in Store 1 in the sixth week.  $390 - 340 = 50$
- (3) Week 4** The steepest line segment is for the time period for Week 4 (between Week 4 and Week 5), an increase of 40 sales.

### Lesson 3: Circle Graphs

#### Practice 3, page 419

- 29%
- $\frac{2}{25}$
- \$630
- \$30.60
- heating and air conditioning
- cooking and refrigeration
- (1) 10** According to the graph, a records clerk spends 25%, or  $\frac{1}{4}$ , of his or her time preparing documents. 25% of 40 hours is 10 hours.
- (5) 56%** If 44% of the time is spent on data entry, then  $100\% - 44\%$ , which equals 56%, is spent on other tasks.
- (2) 10%** Add. 3 cents + 7 cents = 10 cents, and 10 cents out of 100 cents is  $\frac{10}{100}$ , or 10%
- (3) \$48** 40 cents out of every dollar, or 40%, is spent on public bonds. 40% of \$120 is found by multiplying.  $\$120 \times 0.4 = \$48$

### Lesson 4: Frequency and Central Tendency

#### Practice 4.1, page 421

- 57
- 6
- 1:2
- 3:4
- 46
- 14%
- (2)  $\frac{4}{11}$**  There are 16 tally marks next to the reason "wrong size." Add the remaining tally marks.  $16 + 20 + 3 + 5 = 44$  Write a ratio and reduce.  $\frac{16}{44} = \frac{4}{11}$

8. **(4)  $33\frac{1}{3}\%$**  Adding all the tally marks, you find that there were 60 clothing returns in all. Since there are 20 tally marks by “unwanted gift,”  $\frac{20}{60}$  or  $33\frac{1}{3}\%$  of the total reasons given were “unwanted gift.”
9. **(5) Not enough information is given.** You can see that 25 applicants scored from 31 to 45 wpm, but there is no way to determine how many of those scored exactly 40 wpm.
10. **(2) 1:2** To find those who could keyboard above 45 wpm, add.  $18 + 12 = 30$  Those keyboarding below 45 wpm are found by adding.  $35 + 25 = 60$  Write a ratio and reduce.  $\frac{30}{60} = \frac{1}{2}$

#### Practice 4.2, page 423

- mean: 80.14  
median: 80  
mode: 82
- mean: \$8,487.17  
median: \$8,208.50  
mode: none
- mean: \$4.76  
median: \$4.50  
mode: \$4.50
- mean: 309 miles  
median: 300 miles  
mode: none
- mean: \$101.83  
median: \$101.81  
mode: none
- mean: 86  
median: 88  
mode: 88
- mean:  $99.1^\circ$   
median:  $99^\circ$   
mode:  $98^\circ$  and  $100^\circ$
- mean: 1.9 inches  
median: 1.8 inches  
mode: none
- mean: 305  
median: 305  
mode: 305
- mean: 38.8 hours  
median: 40 hours  
mode: 40 hours
- (2) \$117,100** Add the amounts in the column labeled “Asking Price,” and divide by 6, the number of prices listed.
- (4) \$116,500** Arrange the selling prices in order: \$124,800; \$118,400; \$116,500; \$116,500; \$109,000; \$103,600. Since the

number of items is even, there are two in the middle: \$116,500 and \$116,500. Since these are the same amount, the average of the two is also \$116,500.

13. **(1)  $\frac{790 + 1150 + 662 + 805}{4}$**  To find the mean, add the numbers and divide by the number of items in the set. In this case, there are 4 numbers.
14. **(3) \$900** The median is the middle amount. Arrange the amounts in order, and find the middle amount.
15. **(2) 14** The mode is the number that occurs most often. Only 14 occurs more than once in the data.

#### Lesson 5: Probability

##### Practice 5.1, page 425

- $\frac{2}{5}$ , 0.4, 40%
- $\frac{3}{10}$ , 0.3, 30%
- $\frac{1}{5}$ , 0.2, 20%
- $\frac{1}{4}$ , 0.25, 25%
- $\frac{1}{3}$ , 0.33,  $33\frac{1}{3}\%$
- (3) 50%** There are twelve cards in the deck, and six are diamonds.  $\frac{6}{12} = \frac{1}{2} = 50\%$
- (1)  $\frac{3}{4}$**  There are three clubs, so nine are not clubs.  $\frac{9}{12} = \frac{3}{4}$
- (4) 2 out of 5** Sixteen out of 40 trials resulted in tails.  $\frac{16}{40} = \frac{2}{5}$
- (5) 1 out of 2** There are two possible outcomes and one favorable outcome (in this case, heads).

##### Practice 5.2, page 427

- $\frac{1}{36}$
- $\frac{1}{4}$
- $\frac{1}{8}$
- $\frac{9}{38}$
- $\frac{1}{16}$
- $\frac{1}{4}$
- (1)  $\frac{1}{9}$**  The probability of rolling a 5 is  $\frac{1}{6}$ . Of the six equal sections on the spinner, four are even numbers, so there is a  $\frac{4}{6}$ , or  $\frac{2}{3}$ , chance of spinning an even number. Multiply the probability of each outcome.  $\frac{1}{6} \times \frac{2}{3} = \frac{2}{18} = \frac{1}{9}$
- (4)  $\frac{1}{6}$**  The only numbers that are on both the die and the spinner are 2, 3, and 4. There is a 3 in 6, or  $\frac{1}{2}$ , chance of getting a 2, 3, or 4

on the dice. No matter which of those numbers you get on the dice, there is a 2 in 6, or  $\frac{1}{3}$ , chance of getting that number on the spinner. Multiply these probabilities.  $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

9. **(4) 1 out of 3** Of the ten cards, 6 are marked with a square; therefore, there is a 6 in 10, or  $\frac{3}{5}$ , chance of getting a square on the first pick. Now there are only 9 cards left, and 5 are squares: a  $\frac{5}{9}$  chance of getting a square on the second pick. Multiply.  $\frac{3}{5} \times \frac{5}{9} = \frac{15}{45} = \frac{1}{3}$
10. **(2) 80%** After the five white chips are removed from the bag, the bag contains 10 chips, with 8 green and 2 white. The probability of getting green is  $\frac{8}{10}$ , which equals 80%.

#### Lesson 6: Problem Solving

##### Practice 6, page 429

- (3)  $\frac{10}{7}$**  Using the numbers from the table, the ratio is  $\frac{110}{77}$ , which reduces to  $\frac{10}{7}$ .
- (3) 43%** The total number who got their pet from a friend or from an animal shelter is  $84 + 160 = 244$ . Find what percent 244 is of 573.  $\frac{244}{573} \approx 0.426$ , which rounds to 43%
- (1) January** The dotted line represents the temperatures in Boston, and the solid line represents the temperatures in San Francisco. The scale is marked in  $10^\circ$  intervals. Examine the graph to find a month in which the dotted line is two intervals below the solid line. This occurs only in the month of January.
- (3) 58°** There isn't a label for the month of May, but you know May is the month after April. Examine the graph. The lines intersect right after April at a point just below  $60^\circ$  on the scale. The only possible correct answer is option (3).

#### Practice Questions, pages 430–433

##### Part I

- (3) 1997** Only the bar for 1997 falls between 500 and 600 on the scale.
- (3) 40%** Estimate the values for 1998 and 1999. Then find the

percent of decrease. For example, suppose you chose the numbers 650 and 390 for 1998 and 1999. Subtract.  $650 - 390 = 260$  Divide by the original number.  $260 \div 650 = 0.4 = 40\%$  As long as your original estimates were close to 650 and 390, your percent of decrease should be close to 40%.

3. (1)  $\frac{3}{100}$  Jim and his friends bought a total of 12 tickets (4 people  $\times$  3 tickets). 12 out of 400 =  $\frac{12}{400} = \frac{3}{100}$
4. (5)  $50^\circ$  Arrange the low temperatures in order:  $55^\circ, 53^\circ, 50^\circ, 50^\circ, 49^\circ,$  and  $48^\circ$ . Find the middle of the list. Since there are two temperatures in the middle and both are  $50^\circ$ , the mean of the two must be  $50^\circ$ .
5. (3) 1.56 Add the six amounts, and divide by 6. Use your calculator.  $0.45 + 0.63 + 1.34 + 3.53 + 2.57 + 0.84 = 9.36$ , and  $9.36 \div 6 = 1.56$  inches
6. (4) **Woodland Hills** Mentally subtract the low temperature from the high temperature for each area. The greatest difference is in Woodland Hills.  $68^\circ - 50^\circ = 18$
7. (4) **1998** Ticket sales showed a relatively constant increase until 1998. In 1998, ticket sales dropped by almost 100,000.
8. (3) **1997 to 1998** The line graph shows the steepest increase (line rising from left to right) from 1997 to 1998.
9. (4) **32%** Eight customers chose a mouse pad, and 8 out of 25 = 32%.  $8 \div 25 = 0.32 = 32\%$
10. (1) **1 in 2** 26 of the 52 cards are either hearts or diamonds.  $\frac{26}{52} = \frac{1}{2}$
11. **3.5 or  $\frac{7}{2}$**  Add the hours, and divide by 6, the number of weeks.  $5 + 3.5 + 4 + 1.5 + 7 = 21$  hours, and  $21 \text{ hours} \div 6 = 3.5$  hours

3	.	5	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

7	.	2	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

12.

$\frac{2}{5}$  or 0.4 Only the numbers 4 and 5 are greater than 3. The probability is 2 out of 5,  $\frac{2}{5}$ , or 0.4.

2	.	5	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

0	.	4	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

### Part II

13. (2) **41%** You don't need to know exactly how many votes each candidate received. The three candidates who received the smallest percents also received the smallest number of votes. Add.  $9\% + 14\% + 18\% = 41\%$
14. (4) **Bowen and Utley** Since  $\frac{3}{5} = 60\%$ , look for two candidates whose combined percent is close to 60%. Since  $24\% + 35\% = 59\%$ , the correct answer is option (4).
15. (5) **5100  $\times$  0.09** Grace Reiner received 9%, which equals 0.09. You know the percent and the base. Multiply to find the part.
16. (3) **March** The lines for both companies cross in March.
17. (2) **5900** Company A's orders continue to climb at about the same rate. Imagine extending the dotted line to the next month. The line would reach to almost 6000. Option (1) is too high an increase.
18. (5) **Not enough information is given.** The data from the graph shows the number of orders. We have no way of knowing whether the rate of returns at the two companies is the same or different.
19. (3) **24.5** Use only the Shots Attempted column. Put the numbers in order, and find the middle: 29, 27, 26, 25, 24, 24, 23, 18. The two in the middle are 25 and 24. Find the mean of those numbers.  $25 + 24 = 49$ , and  $49 \div 2 = 24.5$
20. (4) **10** Use the Shots Made column. The mode is the number that occurs most often. In this case the mode is 10, which occurs three times.

21. (3)  $\frac{5}{36}$  The probability that a marble is red is  $\frac{8}{24}$ , or  $\frac{1}{3}$ . The chance that a marble is white is  $\frac{10}{24}$ , or  $\frac{5}{12}$ . Multiply.  $\frac{1}{3} \times \frac{5}{12} = \frac{5}{36}$
22. (2)  $\frac{34 + 31 + 42}{3}$  To find the mean, add the three numbers and divide by 3, the number of months in the list. There are 36 employees, but you don't need this number to solve the problem.
23.  $\frac{1}{36}$  The probability of rolling one 1 is  $\frac{1}{6}$ . Multiply to find the chance of rolling two ones.  $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$

1	.	3	6
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

24. **210** Arrange the numbers in order, and find the middle number: 305, 276, **210**, 158, 54.

2	1	0	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

## Measurement

### Lesson 1: The English System of Measurement

#### Practice 1.1, page 435

1. 48 in
2. 7 min
3. 72 hr
4.  $2\frac{1}{2}$  pt
5. 20 qt
6.  $5\frac{1}{2}$  tons
7. 144 in
8. 12 hr
9. 32 c
10. 8 lb
11. 24 ft
12. 7920
13. (3)  $3.75 \times 4$  4 qt = 1 gal, so multiply the number of gallons by 4 to find the number of quarts.
14. (2) **2 ft 3 in** 12 in = 1 ft Divide.  $27 \div 12 = 2$  r3, or 2 ft 3 in



15. (3) 110 The R612 runs 6 hours. Multiply to convert to minutes:  $6 \times 60 = 360$  min. Subtract:  $360 - 250 = 110$  min longer.

### Practice 1.2, page 437

- 9 lb 8 oz
- 10 hr 35 min
- 16 ft 6 in
- 1 gal 2 qt
- 1 yd 6 in
- 13 lb 14 oz
- 1 hr 21 min 40 sec
- 5 ft 10 in
- 1 min 9 sec
- (4)  $15\frac{1}{2}$  Use the measurements from the diagram. Notice that some lengths are used more than once. Add.  $3\text{ ft } 6\text{ in} + 3\text{ ft } 6\text{ in} + 3\text{ ft} + 3\text{ ft} + 30\text{ in} = 12\text{ ft } 42\text{ in} = 15\text{ ft } 6\text{ in} = 15\frac{1}{2}\text{ ft}$
- (2) 6 You need to divide 16 feet by 30 inches. One way is to multiply 16 by 12 to find the number of inches in 16 feet:  $16 \times 12 = 192$  inches. Then divide by 30.  $192 \div 30 = 6.4$  You can cut 6 full lengths of 30 inches. Ignore the remainder.
- (1) 2 qt 10 fl oz  $3\text{ qt} = 2\text{ qt } 2\text{ pt} = 2\text{ qt } 1\text{ pt } 16\text{ fl oz}$   
Subtract.  $2\text{ qt } 1\text{ pt } 16\text{ fl oz}$   

$$\begin{array}{r} - \quad 1\text{ pt } 6\text{ fl oz} \\ \hline 2\text{ qt } \quad 10\text{ fl oz} \end{array}$$
- (3) 22 lb 8 oz  
Multiply.  $3\text{ lb } 12\text{ oz}$   

$$\begin{array}{r} \times \quad 6 \\ \hline 18\text{ lb } 72\text{ oz} \end{array}$$
  
To simplify, divide. Use the fact  $1\text{ lb} = 16\text{ oz}$ .  $72 \div 16 = 4\text{ r}8$   
 $18\text{ lb} + 4\text{ lb } 8\text{ oz} = 22\text{ lb } 8\text{ oz}$
- (5) 8  
Add.  $1\text{ hr } 45\text{ min}$   

$$\begin{array}{r} 2\text{ hr } 30\text{ min} \\ + 3\text{ hr } 45\text{ min} \\ \hline 6\text{ hr } 120\text{ min} \end{array}$$
  
Simplify.  $120\text{ min} \div 60 = 2\text{ hr}$ , so  
 $6\text{ hr } 120\text{ min} = 6\text{ hr} + 2\text{ hr} = 8\text{ hr}$

### Lesson 2: The Metric System

#### Practice 2.1, page 439

- 5000 m
- 6 m
- 4000 mg
- 8000 g
- 4050 cl
- 1.5 l
- 0.25 g
- 30,000 m
- 75 cl
- 0.05 kg
- 35.2 l
- 1500 cm

- (4) 140 There are 100 centimeters in 1 meter.  
 $1.4\text{ m} \times 100 = 140\text{ cm}$
- (0.1183) There are 1000 milliliters in 1 liter.  
 $118.3\text{ ml} \div 1000 = 0.1183\text{ l}$
- (5) 0.5 There are 1000 milligrams in 1 gram.  
 $500 \div 1000 = 0.5\text{ g}$

### Practice 2.2, page 441

- 27.25 cm
- 22,620 g
- 8.18 m
- 0.6 l
- 2.22 kg
- 3130 m
- 129 cl
- 2.4 cm
- 37.5 kg
- 0.25 g
- 645 cm
- 200 l
- (3) 21.1 Convert the two centimeter measures to meters by dividing by 100.  $380\text{ cm} = 3.8\text{ m}$  and  $590\text{ cm} = 5.9\text{ m}$   
Add.  $3.4 + 5.9 + 8 + 3.8 = 21.1\text{ m}$
- (1) 4.13 Multiply the number of milliliters of soda in a can by the number of cans.  
 $355\text{ ml} \times 6 = 2130\text{ ml}$  Convert to liters.  $2130\text{ ml} \div 1000 = 2.13\text{ l}$   
Add the liters of soda and juice.  
 $2.13\text{ l} + 2 = 4.13\text{ l}$
- (2) 625 Convert 2.5 kg to grams.  
 $2.5 \times 1000 = 2500\text{ g}$  Divide.  $2500\text{ g} \div 4\text{ g} = 625$  containers
- (3) 130 Convert 4.8 meters to centimeters.  $4.8 \times 100 = 480\text{ cm}$   
Subtract.  $480 - 350 = 130\text{ cm}$
- (5) 15.12 Set up a proportion and solve.  $\frac{1\text{ cm}}{3.6\text{ km}} = \frac{4.2\text{ cm}}{x}$   $3.6 \times 4.2 \div 1 = 15.12\text{ km}$

### Lesson 3: Using a Calculator

#### Practice 3, page 443

- $5\frac{3}{4}$  or 5.75 lb
- 42 fl oz
- 30 sec
- 100 cl
- $1\frac{1}{4}$  mi
- $18\frac{3}{4}$  or 18.75 lb
- 920 m
- 15 ft 7 in
- 92 oz
- 11 m
- 15 yd 2 ft
- 2.335 m
- 3 qt
- 3500 lb
- 150 mg
- 1 hr 15 min
- 8 fl oz
- 72 g
- 2 ft
- 20 pt
- (4) 124 Add the pounds and the ounces on the packages.  
 $1\text{ lb } 8\text{ oz} + 2\text{ lb } 8\text{ oz} + 3\text{ lb } 12\text{ oz} = 6\text{ lb } 28\text{ oz}$  Multiply the pounds by 16, the number of ounces in a pound.  $6 \times 16 = 96$  oz Add the number of ounces

from the original addition.

$$96\text{ oz} + 28\text{ oz} = 124\text{ oz}$$

- (3) 16 First change  $1\frac{3}{4}$  gallons to cups. Use the decimal equivalent.  $1.75\text{ gal} \times 4 = 7\text{ qt}$ ;  $7\text{ qt} \times 2 = 14\text{ pt}$ ;  $14\text{ pt} \times 2 = 28\text{ c}$  Divide 28 c by 1.75.  $28 \div 1.75 = 16$  bowls
- (2) 170 You need to divide 40 hours by 14 minutes. First change 40 hours to minutes by multiplying.  $40 \times 60 = 2400$  min Divide.  $2400 \div 14 \approx 171.4$  The closest answer choice is option (2).

### Lesson 4: Problem Solving

#### Practice 4, page 445

- b
- b
- a
- c
- b
- a
- a
- b
- c
- a
- a
- b
- a
- (5) kilograms Eliminate the choices that are not reasonable. Options (1), (2), and (4) are very small units of weight. Since they are smaller than a pound, the number of any of these units would have to be greater than 100. Option (3) is a unit of length, not weight. Only option (5) makes sense.
- (4) centimeters Option (1) is incorrect because 15.7 inches would be longer than a 12-inch ruler, much longer than the length of a dollar bill. Options (2) and (5) are too large to use to measure a small item. Option (3) is a very small unit of measure. Only option (4) makes sense.
- (1) 95 fl oz You don't need to do any calculations to solve the problem. Options (2), (4), and (5) are very large quantities. Although you can measure juice in cups, you couldn't possibly make 95 cups of juice by adding only  $4\frac{1}{2}$  cups of water per can. Option (3) is a very small quantity. Only option (1) makes sense.

### Measurement Practice Questions, pages 446–449

#### Part I

- (4) 25 Add and simplify.  $5\text{ ft } 6\text{ in} + 5\text{ ft} + 5\text{ ft } 6\text{ in} + 5\text{ ft} + 48\text{ in} = 20\text{ ft } 60\text{ in} = 20\text{ ft} + 5\text{ ft} = 25\text{ ft}$

2. **(2) 5** Change 48 inches to 4 feet. Divide 20 feet by 4.  $20 \text{ ft} \div 4 = 5$  lengths
3. **(4) 14** Subtract.  $5 \text{ gal} - 1\frac{1}{2} \text{ gal} = 3\frac{1}{2} \text{ gal}$  Convert to quarts by multiplying by 4.  $3\frac{1}{2} = 3.5$  and  $3.5 \times 4 = 14 \text{ qt}$
4. **(3) 7 lb 13 oz** Multiply and then simplify.  $1 \text{ lb } 9 \text{ oz} \times 5 = 5 \text{ lb } 45 \text{ oz} = 5 \text{ lb} + 2 \text{ lb } 13 \text{ oz} = 7 \text{ lb } 13 \text{ oz}$
5. **(5)  $1\frac{1}{4}$**  Add the number of hours Malcom spent updating files this week.  $3 \text{ hr } 15 \text{ min} + 1 \text{ hr } 30 \text{ min} = 4 \text{ hr } 45 \text{ min}$  Subtract from last week's total.  $6 \text{ hr} - 4 \text{ hr } 45 \text{ min} = 5 \text{ hr } 60 \text{ min} - 4 \text{ hr } 45 \text{ min} = 1 \text{ hr } 15 \text{ min}$ , or  $1\frac{1}{4} \text{ hr}$
6. **(3) 80** Convert meters to centimeters.  $0.8 \text{ m} \times 100 = 80 \text{ cm}$
7. **(3) 3.0** Convert milliliters to liters.  $3000 \text{ ml} \div 1000 = 3 \text{ l}$
8. **(4) 1** Convert milligrams to grams.  $1000 \text{ mg} \div 1000 = 1 \text{ g}$
9. **(3) 25.5** First convert the measurements given in centimeters to meters.  $750 \text{ cm} \div 100 = 7.5 \text{ m}$  Add the three lengths.  $7.5 \text{ m} + 7.5 \text{ m} + 10.5 \text{ m} = 25.5 \text{ m}$
10. **(5) Not enough information is given.** You need to know how much a glass holds in order to find the number of glasses of punch.
11. **(3) 100** Use compatible numbers to find the approximate number of brushings. 1500 mg is approximately 1700 mg, and 1700 and 170 are compatible. Convert milligrams to grams.  $1700 \text{ mg} \div 1000 = 1.7 \text{ g}$  Then divide to find the approximate number of brushings per tube.  $170 \text{ g} \div 1.7 \text{ g} = 100$  brushings
12. **(3) 150** Subtract to find how much plastic is left.  $5 \text{ m} - 3.5 \text{ m} = 1.5 \text{ m}$  Convert to centimeters.  $1.5 \text{ m} \times 100 = 150 \text{ cm}$
13. **48.6** Add the amounts.  $15.8 \text{ kg} + 13.5 \text{ kg} + 19.3 \text{ kg} = 48.6 \text{ kg}$
14. **80** Convert gallons to cups, since 1 cup = 8 ounces. 1 gal = 4 qt and 1 qt = 4 c, so 1 gal = 16 c Use this information to find how many cups are in 5 gallons.  $5 \text{ gal} = 16 \text{ c} \times 5 = 80 \text{ cups}$

## Part II

15. **(4)  $\frac{11}{4}$**  The capacity of the humidifier is given in quarts. Divide by 4 to find the capacity in gallons.

16. **(2) 2 ft 3 in** The width of the humidifier is given as 27 inches. Convert to feet and inches.  $27 \text{ in} \div 12 = 2 \text{ ft } 3 \text{ in}$  This is the least amount of space needed for the humidifier.
17. **(2)  $4\frac{1}{2}$**  Divide the number of minutes by 60 minutes to find the number of hours.  $270 \div 60 = 4 \text{ R}30$  A remainder of 30 minutes equals  $\frac{1}{2}$  hour.  $4 \text{ R}30 = 4\frac{1}{2}$  hours
18. **(5) 175  $3\frac{1}{2}$  in = 3.5 in** Set up a proportion and solve.
- $$\frac{1 \text{ in}}{50 \text{ mi}} = \frac{3\frac{1}{2} \text{ in}}{x \text{ mi}}, \text{ and}$$
- $$50 \times 3.5 \div 1 = 175 \text{ mi}$$
19. **(4) 64** Convert any weights given in pounds to ounces. 1 lb = 16 oz and  $1.5 \text{ lb} = 1\frac{1}{2} \text{ lb} = 24 \text{ oz}$  Add the weights.  $16 \text{ oz} + 20 \text{ oz} + 24 \text{ oz} + 4 \text{ oz} = 64 \text{ oz}$
20. **(3) 8** Convert  $2\frac{1}{2}$ , or 2.5 gallons, to cups.  $2.5 \text{ gal} = 10 \text{ qt} = 40 \text{ c}$  Divide by 5 cups to find the number of cooking hours the sauce will last.  $40 \text{ c} \div 5 \text{ c} = 8 \text{ hr}$
21. **(4) 99** Find how many patients the doctor can see per hour.  $60 \text{ min} \div 20 \text{ min} = 3$  Multiply the number of hours the doctor spends on office visits by the number of patients per hour (3).  $33 \text{ hr} \times 3 \text{ patients per hr} = 99$  patients
22. **(5) kilograms** Eliminate option (3), since it is not a unit of weight. Eliminate options (1), (2), and (4), since these are very small units of weight. Kilograms would be the only reasonable unit of measure.
23. **(4) centimeters** Eliminate options (1), (2), and (5), since 28 of these units of length would be too long. Millimeters are too small. Therefore, only option (4) is the correct choice.
24. **(1)  $\frac{(45 + 30)}{15}$**  Find how many ounces of beans are needed in all:  $(45 + 30)$ . Then divide the total by the number of ounces in 1 can of beans.  $\frac{(45 + 30)}{15}$
25. **(1) 90 fl oz** Find how many ounces of water are added to 1 can of concentrate.  $4.5 \text{ c} \times 8 \text{ oz} = 36 \text{ fl oz}$  Add the amount of concentrate.  $36 \text{ fl oz} + 9 \text{ fl oz} = 45 \text{ fl oz}$  Multiply by 2 to find how much 2 cans would make.  $45 \text{ fl oz} \times 2 = 90 \text{ fl oz}$

26. **48** Convert feet to inches by multiplying by 12.  $4 \text{ ft} \times 12 \text{ in} = 48 \text{ in}$
27. **265** Convert hours to minutes.  $2.5 \text{ hr} \times 60 \text{ min} = 150 \text{ min}$  Add to find the total amount of time.  $150 + 45 + 70 = 265 \text{ min}$

## Algebra

### Lesson 1: The Number Line and Signed Numbers

#### Practice 1.1, page 451

- |         |         |
|---------|---------|
| 1. 5    | 13. -50 |
| 2. 45   | 14. -11 |
| 3. 13   | 15. 25  |
| 4. 1    | 16. -35 |
| 5. 1    | 17. -11 |
| 6. 10   | 18. 11  |
| 7. -3   | 19. 10  |
| 8. 13   | 20. 75  |
| 9. -4   | 21. 12  |
| 10. 2   | 22. 2   |
| 11. -22 | 23. -1  |
| 12. 32  | 24. -13 |
25. **(3)  $2 + (-5)$**  The operation starts on +2 and moves 5 units to the left (a negative direction).
26. **(4)  $115^\circ$**  Begin with  $92^\circ$ . Then perform the following operations.  $92^\circ + 12^\circ - 5^\circ + 6^\circ - 3^\circ + 13^\circ = 115^\circ$

#### Practice 1.2, page 453

- |         |          |
|---------|----------|
| 1. 20   | 15. 6    |
| 2. -21  | 16. -20  |
| 3. -48  | 17. -300 |
| 4. 18   | 18. 2    |
| 5. -10  | 19. -5   |
| 6. 3    | 20. 660  |
| 7. -3   | 21. 12   |
| 8. -5   | 22. -120 |
| 9. 2    | 23. -5   |
| 10. -5  | 24. -12  |
| 11. -28 | 25. 20   |
| 12. -3  | 26. -1   |
| 13. -1  | 27. 0    |
| 14. -75 |          |
28. **(2) -7** Substitute the numbers from the spreadsheet for the cells in the expression and solve. Note that A1 is column A, row 1; A3 is column A, row 3; and so on.  $\frac{(-3)(7)(-1)}{(3)(-1)} = \frac{21}{-3} = -7$
29. **(3)  $2(8) \div (-8)$**  To find the product of two numbers, multiply:  $2(8)$ . Then divide by -8, as directed in the problem.

30. (4) The result is a negative number. Do not do the calculations. Instead, examine the factors. Since there is an odd number of negative factors, the answer will be negative. This is the only possible option.

### Lesson 2: Powers and Roots

#### Practice 2, page 455

- 9
  - 4
  - 3 (Although  $-3$  is also a possible answer, you will only be expected to find positive roots on the GED Math Test.)
  - 1
  - 9
  - 7
  - 125
  - $\frac{1}{16}$
  - 16
  - 8
  - $\frac{1}{1000}$
  - 11
  - 6561
  - 1296
  - 12.2
  - 8000
  - 1
  - $\frac{1}{16}$
  - 15.6
  - 10.89
  - 7.5
  - 23.2
  - 1
  - 256
25. (4)  $6^3$  To find the volume, you would need to solve the problem  $6 \times 6 \times 6$ , which can be written as  $6^3$ .
26. (1)  $3^{-3}$  Examine the choices. Options (1) and (5) will result in a fraction, a value less than 1. Options (2), (3), and (4) will all have a value greater than 1. Option (1)  $3^{-3} = \frac{1}{3^3} = \frac{1}{27}$ . Option (5)  $2^{-4} = \frac{1}{2^4} = \frac{1}{16}$ . Since  $\frac{1}{27} < \frac{1}{16}$ , option (1) is the correct choice.

### Lesson 3: Scientific Notation

#### Practice 3, page 457

- $2.3 \times 10^3$
- $4.2 \times 10^{-4}$
- $1.24 \times 10^7$
- $1.432 \times 10^{10}$
- $3.6 \times 10^7$
- $9.5 \times 10^{-3}$
- $5.8 \times 10^{-7}$
- $1.5 \times 10^{11}$
- $9 \times 10^{-9}$
- 0.0005173
- 3,700,000
- 480,000,000
- 0.000017
- 0.0072

- 916,000
- 85,910,000
- 0.00000956
- $2.35 \times 10^4$
- 0.000000001
- 2,670,000,000
- $3 \times 10^8$
- (2)  $4.356 \times 10^4$  In scientific notation, the whole number portion must be a digit from 1 to 9. Option (2) is correct, because the decimal place must be moved 4 places.
- (5)  $5 \times 9.07 \times 10^{-1}$  In scientific notation, a ton =  $9.07 \times 10^{-1}$  metric tons. Multiply this by 5 to find the equivalent weight of five tons.

### Lesson 4: The Order of Operations

#### Practice 4, page 459

- 24
  - 1
  - 29
  - 2
  - 1
  - 20
  - 14
  - 55
  - 10
  - 23
  - 161
  - 30
  - 360
  - 4
  - 6
16. (4)  $(1 - 0.75)(28)(30)$  The total cost of the class can be found by multiplying 28 members by \$30. Since the foundation pays 75%, or 0.75, the hospital will pay  $100\% - 75\%$ , or  $(1 - 0.75)$ . You must multiply the amount the class will cost by the percent that the hospital will pay. Only option (4) performs these operations.
17. (3) Add 5. The operations in the brackets must be performed first. Once these are completed, you would multiply by 2 and then add 5. Notice that it is not necessary to find the value of the expression to answer the question.
18. (2) 28  
 $22 + 6[(14 - 5) \div 3(17 - 14)]$   
 $= 22 + 6[9 \div 3(3)]$   
 $= 22 + 6[9 \div 9]$   
 $= 22 + 6[1]$   
 $= 22 + 6$   
 $= 28$

### Lesson 5: Algebraic Expressions

#### Practice 5.1, page 461

- $x - 7$
  - $3x^2 + x$
  - $8x - 10$
  - $-3x - 2y$
  - $\frac{10}{x} - 5$
  - $-8 + 7x$
  - $16x + x - 3y$
  - $x^2 + x^4$
  - $x^2 + \frac{4}{7}$
  - $15 + \sqrt{x} - 6$
  - $x - (y + 13)$
  - $(x + 6)^2$
  - $17 - (2x + y)$
  - $x + \frac{24}{x}$
  - $2x - 15$
  - $4(x - y)$
  - $5(x^2 - 3)$
  - $x(11 - \sqrt{100})$
19. (4)  $\$1500 + \$0.50(x - 2000)$  Let  $x$  represent the number of tickets sold. The expression  $x - 2000$  is the number of tickets over 2000 sold. Multiply this expression by \$0.50 to find the amount donated based on ticket sales, and add \$1500. Only option (4) shows this sequence of operations.
20. (1)  $(3x + 4y) \div (2 + z)$  The sum of 3 times a number and 4 times another number is represented by the expression  $3x + 4y$ . The sum of 2 and a third number is represented by  $2 + z$ . The first expression is divided by the second. Parentheses are necessary to clarify the order of operations.
21. (2)  $6h + 0.03s$  The correct sequence of operations shows the sum of 6 multiplied by the number of hours ( $6h$ ) and 3% of the sales, or  $0.03s$ . Only option (2) adds these two expressions.

#### Practice 5.2, page 463

- $x^2 + 3x + 2$
- $19y + 13$
- $-3x + 54$
- $6x^3 + 31x^2 + 4$
- $7y + 14$
- $3x + 8$
- $22x - 12$
- $2y^2 + y + 9$
- $-5x - 17$
- $4x - 7$

11. 31  
 12. 48  
 13. 8  
 14. 21  
 15. 72  
 16. 80  
 17. 31  
 18. -19  
 19. 9  
 20. 61  
 21. (5)  $3x^2 + 4x + 1$  Simplify the expression.

$$\begin{aligned} & 3x^2 + 3(x - 3) + x + 10 \\ &= 3x^2 + 3x - 9 + x + 10 \\ &= 3x^2 + 4x + 1 \end{aligned}$$

22. (1)  $x = 2$ ,  $y = 3$  Substitute the values in the choices into the expression. Option (1) equals -11.
- $$\begin{aligned} & 4x^2 - 3(y + 6) \\ &= 4(2^2) - 3(3 + 6) \\ &= 4(4) - 3(9) \\ &= 16 - 27 \\ &= -11 \end{aligned}$$
23. (2)  $20^\circ$  You need to convert a Fahrenheit temperature to centigrade.
- $$\begin{aligned} C &= \frac{5}{9}(F - 32) \\ &= \frac{5}{9}(68 - 32) \\ &= \frac{5}{9}(36) \\ &= 20 \end{aligned}$$

### Lesson 6: Algebraic Expressions and the Calculator

#### Practice 6, page 465

1. 19  
 2. 15.9  
 3. 51  
 4.  $16\frac{1}{2}$   
 5. 10  
 6. -98  
 7. 74  
 8. 146  
 9. 12  
 10. -76  
 11. 57  
 12. 36  
 13. 5  
 14. 24.8  
 15. 54  
 16. -45  
 17. 78  
 18. 108  
 19. 459  
 20. 1430
21. (2) 36.2 Use the formula stated in the problem.
- $$\begin{aligned} P &= 2l + 2w \\ &= 2(12.5) + 2(5.6) \\ &= 25 + 11.2 \\ &= 36.2 \end{aligned}$$
22. (5)  $-2xy$  Try each expression.  
 $x + y = -3$ ;  $-x + y = 7$ ;  
 $-x - y = 3$ ;  $xy = -10$ ; and  
 $-2xy = 20$   
 The value of option (5) is greatest.
23. (1) 32  
 $x^{-4} = \frac{1}{x^4} = \frac{1}{2^4} = \frac{1}{16}$   
 and  $2 \div \frac{1}{16} = 32$

### Lesson 7: Equations

#### Practice 7.1, page 467

1.  $x = 9$   
 2.  $m = 28$   
 3.  $y = -1$   
 4.  $x = -64$   
 5.  $a = 125$   
 6.  $y = -13$   
 7.  $x = 27$   
 8.  $c = 7$   
 9.  $x = -4$   
 10.  $b = -7$   
 11.  $x = 31$   
 12.  $s = -8$   
 13.  $x = 108$   
 14.  $t = 39$   
 15.  $x = 48$   
 16.  $y = -3$   
 17.  $r = 110$   
 18.  $x = 5$   
 19.  $y = -9$   
 20.  $d = -25$   
 21.  $x = 4$   
 22.  $x = -6$   
 23.  $h = 26$   
 24.  $x = 66$   
 25.  $m = -10$   
 26.  $y = 9$   
 27.  $w = -28$   
 28.  $y = 72$
29. (3)  $x + 36 = 77$  Erin's hours ( $x$ ) plus Kayla's hours (36) = 77 hours.
30. (4)  $2y = 38$  Erin worked twice as many hours as Kayla ( $2y$ ), and Erin worked 38 hours, so  $2y = 38$ .
31. (4) 128 A number ( $x$ ) divided by 4 is 32. Solve for  $x$ .
- $$\begin{aligned} \frac{x}{4} &= 32 \\ 4 \cdot \frac{x}{4} &= 4 \cdot 32 \\ x &= 128 \end{aligned}$$
32. (5)  $12x = -60$  Try -5 for  $x$  in each equation. Only option (5) is true when -5 is substituted for  $x$ .
- $$\begin{aligned} 12x &= -60 \\ 12(-5) &= -60 \\ -60 &= -60 \end{aligned}$$
33. (2) \$572.18 -  $c =$  \$434.68 When you subtract the check from the amount in the checking account, the result will be the current balance.

#### Practice 7.2, page 469

1.  $x = 50$   
 2.  $y = -2$   
 3.  $m = 2$   
 4.  $x = -4$   
 5.  $y = 6$   
 6.  $z = 2$   
 7.  $m = 3$   
 8.  $x = 4$   
 9.  $p = 7$   
 10.  $s = -2$   
 11.  $x = 6$   
 12.  $r = -5$   
 13.  $y = 11$   
 14.  $b = 4$   
 15.  $x = -1$   
 16.  $h = 20$   
 17.  $x = 9$   
 18.  $z = 4$   
 19.  $b = 3$   
 20.  $n = 7$
21. (4)  $3x + 9 = 6x - 15$  Three times a number =  $3x$  and "increased by 9" means to add 9. Six times a number =  $6x$ , and "15 less" means to subtract 15. The word *is* shows that the two expressions should be connected by the = symbol.

22. (5) 375 Solve:  $3x + x = 500$   
 $4x = 500$   
 $x = 125$

The variable  $x$  is the number of cards that Travis has. Eric has  $3x$ , or  $3 \cdot 125$ , which equals 375.

23. (1)  $4x - 7 = \frac{x}{3} + 15$  Remember that differences and quotients must be written in the order stated in the problem. The difference of four times a number and 7 is  $4x - 7$ . The quotient of the number and 3 plus 15 is  $\frac{x}{3} + 15$ .
24. (1) \$54 Solve:  
 $x + (2x + 12) = \$174$   
 $3x + 12 = \$174$   
 $3x = \$162$   
 $x = \$54$

### Lesson 8: Common Algebra Word Problems

#### Practice 8, page 471

1. 1800 sq ft  
 2. 10 dimes  
 3. 24 games  
 4. 54  
 5. 8 shirts  
 6. 59  
 7. \$1100  
 8. 28 hours  
 9. (4) 84 Let  $x =$  Wiley's points,  $x + 10 =$  Sylvia's points, and  $x - 6 =$  Greg's points. Write and solve an equation:
- $$\begin{aligned} x + x + 10 + x - 6 &= 226 \\ 3x + 4 &= 226 \\ 3x &= 222 \\ x &= 74 \end{aligned}$$
- Wiley scored 74 points, so Sylvia scored  $74 + 10 = 84$  points.
10. (3) \$12 Let  $x =$  the price of an adult's ticket and  $x - \$6 =$  the price of a child's ticket. In the problem the cost of 2 adults' tickets and 4 children's tickets is \$48. Write and solve an equation:
- $$\begin{aligned} 2x + 4(x - 6) &= \$48 \\ 2x + 4x - \$24 &= \$48 \\ 6x - \$24 &= \$48 \\ 6x &= \$72 \\ x &= \$12 \end{aligned}$$
11. (2) 6 You know that in 12 years Jenny will be twice as old as Tina. Therefore, if you multiply Tina's age in 12 years by 2, it will equal Jenny's age in 12 years. Write and solve an equation:



$$4x + 12 = 2(x + 12)$$

$$4x + 12 = 2x + 24$$

$$2x = 12$$

$$x = 6$$

### Lesson 9: Patterns and Functions

#### Practice 9, page 473

- 0
- 41
- 2
- 40
- 23
- 4
- 31.25
- 13
- 32
- 5
- (2) 49 The number of blocks in each construction equals  $2n - 1$ , where  $n$  is the number in the sequence. The 25th construction would require  $2(25) - 1 = 49$  blocks.
- (4) 16 Each term is 6 greater than the term before it. The next term in the sequence is 10, and the sixth term is 16.
- (2)  $c = \$5.00 - \$0.25(n - 1)$  The original price per scarf (\$5) is reduced by 25 cents starting with the second scarf.
- (2) 1, 5, 9, 13, 17, ... Try the numbers 1, 2, and 3 for  $x$  in the function. This will result in the first three terms of the pattern: 1, 5, and 9. Only option (2) contains these three terms.

### Lesson 10: Function Applications

#### Practice 10, page 475

- a. \$99  
b. \$265
- a. 5.5 or  $5\frac{1}{2}$  hours  
b. 4.25 or  $4\frac{1}{4}$  hours
- a. Plan A  
b. Plan B
- (2) \$29.50 Use the functions for the two jobs, substituting 30 hours for  $h$ .  
Job 1:  $P = \$9.75h$   
 $= \$9.75(30)$   
 $= \$292.50$   
Job 2:  $P = \$70 + \$8.40h$   
 $= \$70 + \$8.40(30)$   
 $= \$70 + \$252$   
 $= \$322$   
Subtract.  $\$322 - \$292.50 = \$29.50$
- (5) Alicia will earn the most at Job 2. Use the functions to find Alicia's wages at all three jobs based on 40 hours.

Job 1:  $P = \$9.75h$   
 $= \$9.75(40)$   
 $= \$390$

Job 2:  $P = \$70 + \$8.40h$   
 $= \$70 + \$8.40(40)$   
 $= \$70 + \$336$   
 $= \$406$

Job 3:  $P = \$380 \cdot \frac{H}{38}$   
 $= \frac{\$380(40)}{38}$   
 $= \$400$

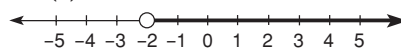
Compare the three results. Alicia will earn the most at Job 2.

- (2) \$19,400 Use the function to calculate the profit.  
 $P = \$95,000 - \$5,400d$   
 $= \$95,000 - \$5,400(14)$   
 $= \$95,000 - \$75,600$   
 $= \$19,400$

### Lesson 11: Inequalities

#### Practice 11, page 477

- $x > 4$
- $x > 7$
- $x \leq -3$
- $x \leq 36$
- $x < -1$
- $x \geq 5$
- $x > -8$
- $x > 4$
- $x < -7$
- $x < 2$
- $x \geq 3$
- $x < 6$
- $x \geq 2$
- $x > -10$
- $x \leq 3$
- $x < 21$
- $x \geq -1$
- $x < 3$
- $x < 7$
- $x \leq 3$
- $-2 \leq x \leq 2$
- $-20 < x < 6$
- $6 < x < 16$
- $4 \leq x \leq 9$
- (1)  $s \leq 16$  The perimeter must be less than or equal to 64, so solve the inequality:  $4s \leq 64$ , which leads to  $s \leq 16$ .
- (4)



Solve the inequality:  
 $-4x + 3 < -3x + 5$   
 $-x < 2$   
 $x > -2$

To graph the solution  $x > -2$ , place an open circle at  $-2$  because  $-2$  is not included in the solution. Then extend the line to the right to include all values greater than  $-2$ .

### Lesson 12: Quadratic Equations

#### Practice 12, page 479

- $x^2 + 6x + 8$
- $x^2 + 2x - 15$

- $x^2 + 3x - 4$
- $x^2 - 9x + 18$
- $x^2 + 6x - 16$
- $2x^2 - 3x - 2$
- $x^2 - 14x + 45$
- $3x^2 + x - 2$
- $x^2 + 5x - 14$
- $3x^2 + 14x + 16$
- $x^2 - x - 30$
- $x^2 - 13x + 30$
- $4x^2 + 6x + 2$
- $x^2 + 5x - 36$
- $x^2 - 10x + 25$

For questions 16–30, the order of the factors does not matter:

$$(2x - 1)(x + 3) = (x + 3)(2x - 1)$$

- $(x + 1)(x + 3)$
- $(x - 1)(x + 5)$
- $(x + 2)(x + 6)$
- $(x - 3)(x + 2)$
- $(x - 2)(x + 7)$
- $(x - 4)(x + 3)$
- $(x - 5)(x + 7)$
- $(x - 6)(x - 6)$
- $(x - 7)(x + 1)$
- $(x - 4)(x + 8)$
- $(2x - 1)(x + 3)$
- $(2x - 10)(x + 1)$  or  $(2x + 2)(x - 5)$
- $(x - 5)(x + 10)$
- $(2x - 1)(2x + 3)$
- $(x - 7)(x + 8)$
- (2) -4 and 5

Rewrite the equation as equal to 0. Then factor.  $x^2 - x - 20 = 0$   
 $(x - 5)(x + 4) = 0$

Determine which values of  $x$  will make each factor equal to 0. The solutions 5 and  $-4$  will make the equation true.

- (5)  $2x^2 + 2x - 24 = 0$  Substitute  $-4$  into each equation. Do not take time to factor and find solutions for each equation. Only option (5) is correct.  
 $2x^2 + 2x - 24 = 0$   
 $2(-4)^2 + 2(-4) - 24 = 0$   
 $2(16) + -8 - 24 = 0$   
 $32 - 32 = 0$
- (3) 6  
Factor.  $2x^2 - 7x - 30 = 0$   
 $(2x + 5)(x - 6) = 0$   
 $2x + 5 = 0$  will yield a negative solution. If  $x = 6$ , the expression  $x - 6$  equals 0; therefore, option (3) is correct.

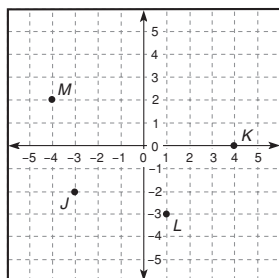
34. (2)  $x - 10$

You know that length  $\times$  width = area. You need to factor the expression  $2x^2 - 27x + 70$ , and one of the factors is the length  $2x - 7$ .  $2x^2 - 27x + 70 = (2x - 7)(x - 10)$  The width is  $(x - 10)$ .

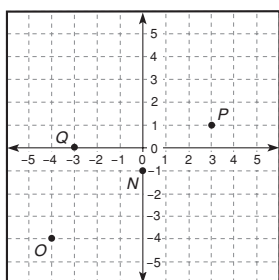
### Lesson 13: The Coordinate Plane

#### Practice 13, page 481

- $(-4, 5)$
- $(3, 6)$
- $(0, -3)$
- $(6, -7)$
- $(-5, 0)$
- $(-6, -4)$
- $(2, 0)$
- $(7, -2)$
- 



10.



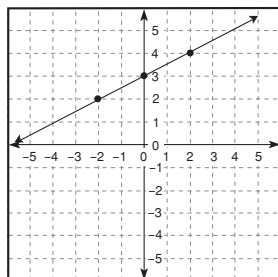
- (5)  $(-1, 0)$  Plot each point in the answer choices. Only option (5) lies on the line that passes through points A and B.
- (1)  $(-3, -2)$  Find the two points discussed in the problem. Then locate the third corner of the triangle, and find the coordinates of the corner. The missing corner is 3 spaces to the left of the origin and 2 spaces down:  $(-3, -2)$ .

### Lesson 14: Linear Equations

#### Practice 14, page 483

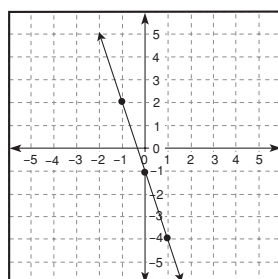
1.

If $x =$	then $y =$
-2	2
0	3
2	4



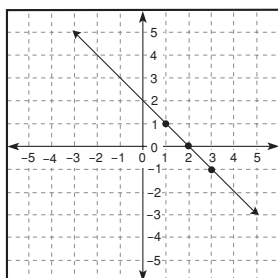
2.

If $x =$	then $y =$
-1	2
0	-1
1	-4



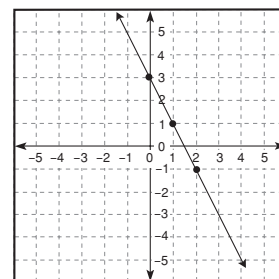
3.

If $x =$	then $y =$
1	1
2	0
3	-1



4.

If $x =$	then $y =$
0	3
1	1
2	-1



- (3) point T and  $(0, 0)$  Try the coordinates for points S and T in the equation. Both lie on the graph of the equation. Check the remaining points in the answer choices. Only  $(0, 0)$  will make the equation  $y = \frac{1}{4}x$  true.
- (4)  $y = -4x - 2$  Choose a point on line P, either  $(-1, 2)$  or  $(0, -2)$  and try the point in the equations. If the point works in an equation, try the other point as well. Both points work in only option (4)  $y = -4x - 2$ .
- (2)  $2x + 3y = 9$  Try the coordinates  $(-3, 5)$  in each equation. Only option (2) is true.
 
$$2x + 3y = 9$$

$$2(-3) + 3(5) = 9$$

$$-6 + 15 = 9$$

$$9 = 9$$

### Lesson 15: Slope of a Line

#### Practice 15, page 485

- 1
- 2
- 0
- $\frac{3}{4}$
- $-\frac{1}{2}$
- 0
- $-\frac{1}{3}$
- 2
- 3
- (1) line A Moving from left to right, only lines A and E have a negative slope. Compare the rise to run for both lines. Line A moves down 1 space each time it goes 3 spaces to the right, a ratio of -1 to 3 or  $-\frac{1}{3}$ .

11. (2)  $-2$  You have more information than you need. Choose any two points and use the slope formula to solve for the slope. The equation below uses (0,4) and (1,2).

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{0 - 1} = \frac{2}{-1} = -2$$

12. (4) (2,3) The best way to solve the problem is probably to make a quick sketch. Because the line has a slope of 3, start at point (1,0) and count 3 spaces up and 1 space to the right. You are now at point (2,3), which is option (4). You can check your work using the slope formula.

### Lesson 16: Distance Between Points

#### Practice 16, page 487

- 5.8
  - 3.6
  - 4.1
  - 4.5
  - 5.4
  - 12.7
  - 9.2
  - 7.1
  - 2.2
10. (3) 10 Point A is located at  $(-4, -2)$  and point C is at  $(5, 3)$ . Use the distance formula:
- $$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
- $$= \sqrt{(-4 - 5)^2 + (-2 - 3)^2}$$
- $$= \sqrt{(-9)^2 + (-5)^2}$$
- $$= \sqrt{80 + 25}$$
- $$= \sqrt{106} \approx 10$$
11. (4) (1,3) A horizontal segment connects B and C, so you can count spaces to find the distance. The segment is 8 units in length, so the midpoint is 4 units from either B or C. Count 4 spaces and determine the coordinates of the point: (1,3).
12. (2) 6.3 Point S is located at  $(-4, -3)$ , and point T is located at  $(-2, 3)$ . Use the distance formula:
- $$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
- $$= \sqrt{(-4 - (-2))^2 + (-3 - 3)^2}$$
- $$= \sqrt{(-2)^2 + (-6)^2}$$
- $$= \sqrt{4 + 36}$$
- $$= \sqrt{40} \approx 6.3$$

13. (1) 5 Point S is located at  $(-4, -3)$  and the origin on any coordinate grid is at  $(0, 0)$ . Use the distance formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-4 - 0)^2 + (-3 - 0)^2}$$

$$= \sqrt{(-4)^2 + (-3)^2}$$

$$= \sqrt{16 + 9}$$

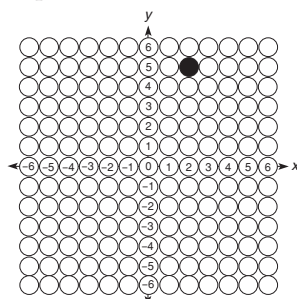
$$= \sqrt{25}$$

$$= 5$$

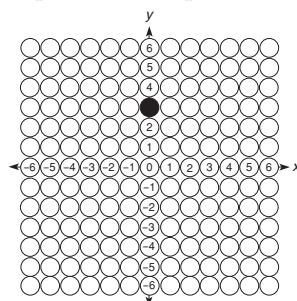
### Lesson 17: Special Coordinate Grid Items

#### Practice 17, page 489

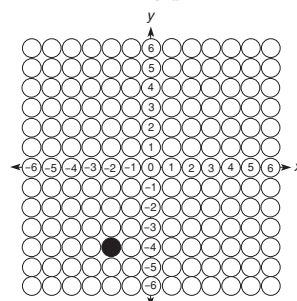
1. (2,5) Determine the missing point.



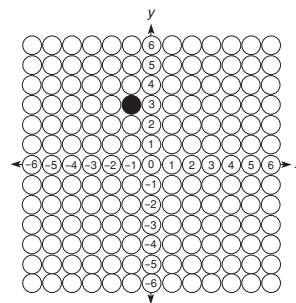
2. (0,3) To find the slope, count up 1 and 2 to the right. The next point will be plotted at (0,3).



3.  $(-2, -4)$  Plot the known corners of the rectangle and determine the missing point.



4.  $(-1, 3)$  Start at  $(4, -6)$ . Count up 9 spaces and 5 to the left.



### Lesson 18: Problem Solving

#### Practice 18, page 491

- (3) 24 Take each number and divide by 2; then compare to the original number.  $24 \div 2$  is 12, which is 12 less than 24.
- (4) \$200 Try each number: For example, option (1): If Barbara raised \$100, then Matt would have raised \$50. To reach a total of \$900, Sandra would have to raise \$800, which is more than three times \$100. Therefore, option (1) is incorrect. Only option (4) works. Barbara raised \$200, Matt raised \$150, and Sandra raised \$600, which is 3 times \$200.
- (4) 5 Try each option. Since the first package is the middle weight package and the total weight is 15 pounds, the package probably weighs a medium amount. You may want to start in the middle of the answer choices. Option (4) is the only one that works: If the first package weighs 5 pounds, then the second package weighs  $2\frac{1}{2}$  pounds, and the third weighs  $7\frac{1}{2}$  pounds, for a total of 15 pounds.
- (2) 82 You know that the second test is 6 points higher than the first. Add 6 to each score in the answer options. Then add to see whether the two scores would equal 170. Only option (2) works.  $82 + 88 = 170$
- (2) 10 Six years ago Nelson was five times as old as Maria. Start with this fact and work backward. If Nelson was 10 years old six years ago, then Maria was  $10 \div 5 = 2$  years old. Six years later, Nelson was 16 and



Maria was 8. Since 16 is twice 8, option (2) is correct.

6. (1)  $-3$  Try each option in the equation. Only option (1) works.
- $$2x^2 + x - 15 = 0$$
- $$2(-3)^2 + -3 - 15 = 0$$
- $$2(9) - 3 - 15 = 0$$
- $$18 - 18 = 0$$
- $$0 = 0$$
7. (3) **6** Use a calculator for this one. Multiply each answer choice by \$15. Then subtract from \$440 and divide the difference by \$25 to find the number of children's passes. Add the number in the options to the number of passes for adults to see whether the total is 20. Only option (3) works.  $\$15 \times 6 = \$90$ , and  $\$440 - \$90 = \$350$ . Divide.  $\$350 \div \$25 = 14$ . Since  $14 + 6 = 20$  passes, option (3) is correct.
8. (3) **20** You know that the distance around is 120 feet. The length added to the width is half the distance around, or 60 feet. Take each answer choice and double it to find the length. Then add. Only option (3) works.  $20 \text{ ft} \times 2 = 40 \text{ ft}$ , and  $20 \text{ ft} + 40 \text{ ft} = 60 \text{ ft}$

### Algebra Practice Questions, pages 492–495

#### Part I

1. (5)  $-4x - 6$  Use the order of operations.
- $$6 - 4(x + 3) = 6 - 4x - 12$$
- $$= -4x - 6$$
2. (1)  $-3$
- $$3 + 4x = x - 6$$
- $$3x = -9$$
- $$x = -3$$
3. (3)  $1.26 \times 10^8$  Use your calculator to multiply.
- $$180,000 \times 700 = 126,000,000$$
- A number written in scientific notation must have a single-digit whole number. Move the decimal point 8 places to the left and multiply 1.26 by 10 raised to the 8th power.
4. (4)  $4x - y = -7$  Try  $x = -2$  and  $y = -1$  in each equation. Only option (4) is true.
- $$4(-2) - (-1) = -7$$
- $$-8 + 1 = -7$$
- $$-7 = -7$$
5. (4) **\$510** Let  $x = \text{Tom's earnings}$

and  $2x - \$150 = \text{Jan's earnings}$ .

$$2x - \$150 + x = \$1380$$

$$3x - \$150 = \$1380$$

$$3x = \$1530$$

$$x = \$510$$

6. (4) **D** The coordinates of  $D$  are  $(-3, -2)$ , which make the equation  $y = -x - 5$  true.
- $$y = -x - 5$$
- $$-2 = -(-3) - 5$$
- $$-2 = 3 - 5$$
- $$-2 = -2$$
7. (3)  $\frac{1}{3}$  Count the rise and run from  $C$  to  $B$ . The line moves up 3 spaces as it moves 9 to the right.  $\frac{3}{9} = \frac{1}{3}$
8. (1)  $s \geq \$17,500$  Samuel's earnings can be represented by the expression  $\$350 + 0.1s$ , where  $s = \text{total sales}$ . Since Samuel needs to earn at least \$2,100, this expression must be greater than or equal to \$2,100. Solve.
- $$\$350 + 0.1x \geq \$2,100$$
- $$0.1x \geq \$1,750$$
- $$s \geq \$17,500$$
9. (2) **\$5.35** Substitute 24 for  $n$  and solve.
- $$F = \$3.95 + \$0.10(24 - 10)$$
- $$= \$3.95 + \$0.10(14)$$
- $$= \$3.95 + \$1.40$$
- $$= \$5.35$$
10. (5) **29** Let  $x = \text{the first number}$ . The remaining numbers are  $x + 2$ ,  $x + 4$ , and  $x + 6$ . Solve.
- $$x + (x + 2) + (x + 4) + (x + 6) = 104$$
- $$4x + 12 = 104$$
- $$4x = 92$$
- $$x = 23$$
- The numbers are 23, 25, 27, and 29. The problem asks for the largest of these numbers.
11. (3)  $3^6$   $3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$  The other expressions are less than 400.
12. (2)  $5x - 4 = 8 + 2 + 3x$  Translate each part of the problem to numbers and symbols, and connect with the  $=$  symbol.
13. (2)  $-26$  Substitute the given values, and use the order of operations.
- $$6(x - y) - 8x = 6(-2 - 5) - 8(-2)$$
- $$= 6(-7) + 16$$
- $$= -42 + 16$$
- $$= -26$$
14. (3) **31** From 1 to 7, there is a difference of 6. From 7 to 14, there is a difference of 7. From 14 to

22, there is a difference of 8. Add 9 to 22.  $22 + 9 = 31$

#### 15. 61

		6	1	
	7	7	7	
.	.	.	.	.
0	0	0	0	0
1	1	1	●	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	●	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Use the order of operations.

$$4^2 - \frac{3(12 + 2^2)}{6} + 5(4) - 15$$

$$= 64 - \frac{3(12 + 4)}{6} + 5(4) - 15$$

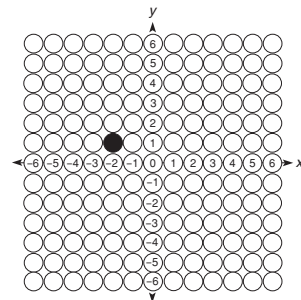
$$= 64 - \frac{3(16)}{6} + 5(4) - 15$$

$$= 64 - \frac{48}{6} + 5(4) - 15$$

$$= 64 - 8 + 20 - 15$$

$$= 61$$

16.  $(-2, 1)$  Choose values, and graph both lines. Or create a table for each linear equation to find values of  $y$  when substituting values for  $x$ , for example, 0, 1, 2,  $-1$ , and  $-2$ . The lines intersect at point  $(-2, 1)$ .



#### Part II

17. (1)  $-7x - (8 + y)$  Remember, the word *product* indicates multiplication, and the word *sum* indicates addition.
18. (3) **8 and  $-3$**  Either solve by factoring, or try each option in the equation. The correct factoring is:
- $$x^2 - 5x - 24 = 0$$
- $$(x - 8)(x + 3) = 0$$
- $$x = 8 \text{ or } x = -3$$
19. (2) **4** Write an equation and solve.
- $$6x + 6 = 3(x + 6)$$
- $$6x + 6 = 3x + 18$$
- $$3x = 12$$
- $$x = 4$$

20. (3)  $y = 2x - 3$  Try the given points in the equations in the answer options. Only option (3) is correct.

21. (2)  $x < 2$  Solve.  
 $-2(x - 6) > 8$   
 $-2x + 12 > 8$   
 $-2x > -4$   
 $x < 2$

Remember to reverse the inequality symbol when you divide both sides by  $-2$  in the last step.

22. (2)  $(-5, 1)$  Point  $L$  is 5 spaces to the left of the origin along the  $x$ -axis and 1 space above the origin along the  $y$ -axis.
23. (3) 10 Use the distance formula and points  $(-3, 4)$  and  $(3, -4)$ .  
distance =  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$   
 $= \sqrt{(-3 - 3)^2 + (4 - -4)^2}$   
 $= \sqrt{-6^2 + 8}$   
 $= \sqrt{36 + 64}$   
 $= \sqrt{100} = 10$
24. (3) \$18 Let  $x =$  Sam's gift and  $x =$  Daniel's gift. Celia's gift is  $x + \$12$ , and Bob's is  $\frac{1}{2}(x + \$12)$ . Write an equation and solve:  
 $x + x + (x + \$12) + \frac{1}{2}(x + \$12) = \$81$   
 $x + x + x + \$12 + \frac{1}{2}x + \$6 = \$81$   
 $3\frac{1}{2}x + \$18 = \$81$   
 $3\frac{1}{2}x = \$63$   
 $x = \$18$

25. (1)  $x \leq 3$  Solve.  
 $-7x - 4 \geq x - 28$   
 $-8x \geq -24$   
 $x \leq 3$

26. (5) 169 Substitute and apply the order of operations.  
 $5x^2 - xy + 7y^2 =$   
 $= (5)(3^2) - (3)(-4) + 7(-4)^2$   
 $= (5)(9) - (3)(-4) + 7(16)$   
 $= 45 + 12 + 112$   
 $= 169$

27. (3) 8,652 Write an equation and solve. Let  $x =$  the votes for the leading candidate.  
 $x + \frac{1}{3}x + 5,512 = 18,072$   
 $\frac{1}{3}x = 12,560$   
 $x = 9,420$  votes

for the leading candidate  
Substitute to find the votes for Perez.  $\frac{1}{3}(9,420) + 5,512 = 8,652$

28. (2)  $x = -2$  Solve.  
 $-4(x + 2) - 10 = 5x$   
 $-4x - 8 - 10 = 5x$   
 $-18 = 9x$   
 $-2 = x$

29. (5)  $\$5x + \$10(35 - x) = \$240$  The total value of the \$5 bills is  $\$5x$ . Since there are 35 bills, the number of \$10 bills must be  $35 - x$ . The value of the \$10 bills is  $\$10(35 - x)$ . The sum of the expression is equal to \$240.

30. (4) 75 Solve.  
 $x + x + 1 + x + 2 + x + 3 + x + 4 = 370$   
 $5x + 10 = 370$   
 $5x = 360$   
 $x = 72$

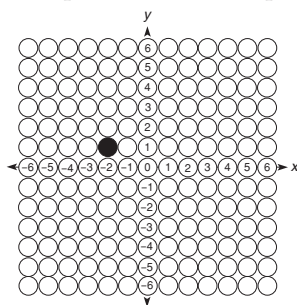
The numbers are 72, 73, 74, 75, and 76. The fourth number is 75.

31. 4

			4	
7	7	7		
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Substitute and solve.  
 $E = \frac{9r}{t}$   
 $= \frac{9(8)}{18} = \frac{72}{18} = 4$

32.  $(-1, 1)$  The given points lie in a vertical line. Since the distance between the points is 8 spaces, the midpoint is  $(-1, 1)$ , which is 4 spaces from either point.



## Geometry

### Lesson 1: Points, Lines, and Angles

#### Practice 1, page 497

- acute
- obtuse
- straight
- acute
- reflex
- right
- acute
- obtuse

9. (1)  $135^\circ$   $m\angle RZS + m\angle QZS = 180^\circ$ . Since  $\angle RZS$  measure  $45^\circ$ ,  $\angle QZS$  must measure  $135^\circ$ .
10. (3) right Since  $m\angle RZQ = 180^\circ$ , subtract the two known angles to find the measure of  $\angle SZT$ .  $180^\circ - 45^\circ - 45^\circ = 90^\circ$ . Since  $\angle SZT$  measures  $90^\circ$ , it is a right angle.
11. (1)  $38^\circ$   $\angle AWB + \angle BWC + \angle CWD = \angle AWD$ , a straight angle with a measure of  $180^\circ$ . You know that  $m\angle AWB = 90^\circ$  and  $m\angle CWD = 52^\circ$ , so substitute those values in the first equation:  $90^\circ + \angle BWC + 52^\circ = 180^\circ$ , which leads you to  $\angle BWC = 38^\circ$ .
12. (3) obtuse  $m\angle AWC$  is greater than the right angle  $AWB$  and less than the straight angle  $AWD$ .  $\angle AWC$  must be obtuse.

### Lesson 2: Parallel Lines and Transversals

#### Practice 2, page 499

All possible answers are shown.

- $\angle 4$  and  $\angle 6$ ,  $\angle 3$  and  $\angle 5$
- $\angle 3$
- $100^\circ$
- $\angle 1$  and  $\angle 7$ ,  $\angle 2$  and  $\angle 8$
- $\angle 2$  and  $\angle 4$ ,  $\angle 1$  and  $\angle 3$ ,  $\angle 5$  and  $\angle 7$ ,  $\angle 6$  and  $\angle 8$
- $\angle 4$
- (2)  $75^\circ$   $\angle 3$  and  $\angle 1$  are vertical angles. Therefore,  $m\angle 3 = m\angle 1$ . Since  $\angle 3 = 75^\circ$ , then  $\angle 1 = 75^\circ$ .
- (3) They are in the same position from one parallel line to the other. The transversal and the parallel lines form eight angles. Corresponding angles lie on the same side of the transversal and have the same relationship to the nearest parallel line.
- (2)  $65^\circ$  Angle 7 and  $\angle 3$  are corresponding angles, so  $m\angle 7 = m\angle 3$ ; therefore,  $m\angle 3 = 115^\circ$ . Angle 3 and  $\angle 4$  are adjacent angles, which means  $115^\circ + m\angle 4 = 180^\circ$ .  $m\angle 4 = 65^\circ$
- (5)  $\angle 8$  Angle 2 and  $\angle 8$  are alternate exterior angles. Therefore, they are equal.

### Lesson 3: Quadrilaterals

#### Practice 3, page 501

- rectangle, square
- parallelogram, rectangle, square, rhombus

3. trapezoid
4. rectangle, square
5. none
6. rectangle, square, parallelogram, rhombus
7. square, rhombus
8. rectangle, square, parallelogram, rhombus, trapezoid
9. trapezoid
10. square
11. (4)  $140^\circ$  Let  $x =$  the measure of  $\angle H$ .  $3x + 20^\circ = m\angle F$ . The sum of the angles of a quadrilateral is  $360^\circ$ , so  $3x + 20^\circ + x + 90^\circ + 90^\circ = 360^\circ$ . Solve the equation.  $4x + 200^\circ = 360^\circ$ , so  $4x = 160^\circ$ ,  $x = 40^\circ$ , and  $3x + 20^\circ = 140^\circ$
12. (2)  $EF \parallel GH$  A trapezoid is a quadrilateral with exactly one pair of parallel sides.
13. (3)  $90^\circ$  If the opposite sides of a figure are parallel and all four sides are equal, then the figure is either a square or rhombus. Since  $\angle T$  is a right angle, the figure is square. Therefore, all the angles measure  $90^\circ$ .
14. (4) **parallelogram** The quadrilateral has opposite sides that are equal and opposite angles that are equal. It is either a rectangle or a parallelogram. Since the figure has no right angles, it is not a rectangle. The quadrilateral must be a parallelogram.

#### Lesson 4: Triangles

##### Practice 4, page 503

1. equilateral, acute
2. scalene, obtuse
3. isosceles, acute
4.  $64^\circ$
5.  $45^\circ$
6.  $97^\circ$
7. (3) **14** Solve for  $\angle BAC$ :  $m\angle BAC + 55^\circ = 115^\circ$ , so  $m\angle BAC = 60^\circ$ . Solve for  $\angle BCA$ :  $m\angle BCA + 35^\circ = 95^\circ$ , so  $m\angle BCA = 60^\circ$ . If two of the angles of  $\triangle ABC$  each measure  $60^\circ$ , the third angle also measures  $60^\circ$ . The triangle is equilateral, and all the sides are equal to side  $AB$ .
8. (4) **right**  $55^\circ + 35^\circ + m\angle D = 180^\circ$ . Solve for the missing angle:  $m\angle D = 90^\circ$ . Therefore, the triangle is a right triangle.
9. (3)  **$86^\circ$**  The angles of a triangle add up to  $180^\circ$ .  $38^\circ + 56^\circ = 94^\circ$ ,

so the third angle can be found by subtracting  $94^\circ$  from  $180^\circ$ .  
 $180^\circ - 94^\circ = 86^\circ$

#### Lesson 5: Congruent and Similar Triangles

##### Practice 5, page 505

1. No
2. Yes
3. Not enough information
4. (4) **48** Since the triangles are similar, the sides must be proportional. Set up the ratio  $\frac{25}{40} = \frac{30}{x}$  where  $x$  equals the length of  $ST$ . Solve.  $x = 48$
5. (2)  **$64^\circ$**  Similar triangles have equal angle measures. If  $m\angle S = 68^\circ$ , then  $m\angle TYX = 68^\circ$ .  $m\angle TYX + m\angle T + m\angle TXY = 180^\circ$ . Substitute and solve.  $68^\circ + 48^\circ + m\angle TXY = 180^\circ$ ,  $m\angle TXY = 64^\circ$
6. (3) **3.2** The two triangles are similar because two of the angle measures in one triangle are equal to two of the angle measures in the other triangle. The side labeled  $x$  corresponds to the side with length 4.8. The side of length 2.8 corresponds to the side with length 4.2. Solve the ratio  $\frac{x}{4.8} = \frac{2.8}{4.2}$ .  $x = 3.2$

#### Lesson 6: Similar Triangle Applications

##### Practice 6, page 507

1. (3) **64** Set up a proportion comparing the sign's shadow to the building's shadow and the sign's height to the building's height.  $\frac{6}{48} = \frac{8}{x}$  Solve.  $x = 64$
2. (2) **42** The 10-ft pole is 25 ft from the vertex of the angle; the base of the cliff is  $80 + 25$ , or 105 ft from the vertex of the angle. Set up a proportion.  $\frac{105}{25} = \frac{x}{10}$  Solve.  $x = 42$
3. (1)  $\frac{2.5}{22.5} = \frac{1}{x}$  Set up a proportion comparing the meter stick's shadow to the flagpole's shadow and the meter stick's height to the flagpole's height.
4. (5) **49** Examine the two triangles to find corresponding sides. The 8-ft side of the smaller triangle corresponds to the 28-ft side of the larger triangle. Write a proportion and solve.  $\frac{8}{28} = \frac{14}{x}$ ;  $x = 49$

5. (2) **4** If you imagine a line drawn at the bottom of the frame, you will have two similar triangles. The base of the large triangle is 6 ft, and the base of the small triangle is unknown. The side of the large triangle is 12 ft and the side of the small one is  $12 - 4 = 8$  ft. Write a proportion and solve.  $\frac{8}{12} = \frac{x}{6}$ ;  $x = 4$

#### Lesson 7: Perimeter and Area

##### Practice 7, page 509

1. area: 39 sq units  
perimeter: 30.8 units
2. area: 29.6 sq units  
perimeter: 24.6 units
3. area: 16 sq units  
perimeter: 16 units
4. area: 616 sq units  
perimeter: 109 units
5. area: 640 sq units  
perimeter: 104 units
6. area: 38 sq units  
perimeter: 32 units
7. (4) **56** The shaded portion is a trapezoid.  
 $\frac{1}{2} \times (5 + 9) \times 8 = 56$  sq in
8. (5) **Not enough information is given.** From the measures of the sides, you cannot determine the height of the parallelogram.
9. (4) **324** Subtract the area of the patio from the area of the entire yard. Both are rectangles, so multiply length and width to find the area.  
 $(24 \times 18) - (12 \times 9) = 324$  sq ft
10. (2) **24** Simply add:  $6 + 6 + 6 + 6 = 24$  cm, or multiply by 4:  $6 \times 4 = 24$  cm.

#### Lesson 8: Circles

##### Practice 8, page 511

1.  $C = 62.8$  in,  $A = 314$  in<sup>2</sup>
2.  $C = 12.6$  cm,  $A = 12.6$  cm<sup>2</sup>
3.  $C = 25.1$  m,  $A = 50.2$  m<sup>2</sup>
4. (3) **38** Use the formula  $C = \pi d$ , where  $d = 12$ .  $12(3.14) = 37.7$
5. (2)  **$3.14 \times 6^2$**  The formula for the area of a circle is  $A = \pi r^2$ . The radius of a circle is half of the diameter. Half of 12 is 6. Substitute 6 for  $r$  and 3.14 for  $\pi$ .  $A = 3.14 \times 6^2$
6. (2) **13.0** The diameter of a circle is twice the radius.  $6.5 \times 2 = 13$

7. **(3) 19** You need to find the circumference of the 10-point band. First find the diameter, which passes through the inner circle. Add the width of the 10-point band twice and the diameter of the inner circle:  $2 + 2 + 2 = 6$  inches. Now you can use the formula for circumference.  $6(3.14) = 18.84$ , which rounds to 19 inches.

### Lesson 9: Volume

#### Practice 9.1, page 513

- 160 cubic units
- 27 cubic units
- 141 cubic units
- 420 cubic units
- 3 cubic units
- 236 cubic units
- (1) 5**  $V = lwh$  You know that the length and width of the box both equal 4 and that the volume equals 80. Solve the equation.  
 $80 = 4(4)h$   
 $80 = 16h$   
 $5 = h$
- (3) 125** If each edge measures 5 feet, then the figure is a cube.  
 $5^3 = 125$
- (4) 17** First, you must find the volume of the pool. The radius of the pool is 6 and the height is 3.  
 $V = \pi r^2 h$   
 $\approx 3.14(6^2)(3)$   
 $\approx 3.14(36)(3)$   
 $\approx 339.12$   
 Therefore, the volume is about 339. Solve the ratio  $\frac{1}{20} = \frac{x}{339}$ , where  $x$  equals the number of scoops Linda must add.  
 $20x = 339; x = 16.95$ , about 17

#### Practice 9.2, page 515

- $9 \text{ in}^3$
- $127 \text{ in}^3$
- $314 \text{ cm}^3$
- $480 \text{ m}^3$
- $11 \text{ in}^3$
- $1060 \text{ cm}^3$
- (4) 480** First, you have to find the volume of the original package. Solve the equation.  
 $V = \frac{1}{3} \times 10^2 \times 15 = 500$   
 Then find the volume of the new package. Add 4 to the

length and width of the base, which gives you 14. Now solve the equation.

$$V = \frac{1}{3} \times 14^2 \times 15 = 980$$

Find the difference of the two volumes.  $980 - 500 = 480$

8. **(3) 67** You know that the height of the cone is half of the diameter of the base. Since the radius of the base is also half of the diameter, the radius must equal the height. Therefore, the radius is 4. Now solve the equation.  
 $V = \frac{1}{3} \times \pi \times 4^2 \times 4 \approx 67$
9. **(5) The volume of B is less than the volume of A.** First, find the volumes of the two figures. Figure A is a rectangular solid. Use the formula  $V = lwh$ .  $4 \times 3 \times 2 = 24$  Figure B is a pyramid. Use the formula  $V = \frac{1}{3}e^2h$ .  
 $\frac{1}{3} \times 3^2 \times 6 = 18$  Now compare the two volumes. Since  $24 > 18$ , option (5) must be the answer.
10. **(4) 1000** Use the formula  $V = \frac{1}{3}\pi r^2 h$ :  $\frac{1}{3} \times \pi \times 8^2 \times 15 \approx 1,005$ , which is about 1000.

### Lesson 10: Irregular Figures

#### Practice 10, page 517

- $P = 149$  units  
 $A = 1040$  sq units
- $P = 49.7$  units  
 $A = 159.25$  sq units
- $P = 71$  units  
 $A = 171$  sq units
- $V = 185$  cubic units
- $V = 278$  cubic units
- $V = 399$  cubic units
- (1) 360** Find the volume of the main rectangular slab:  $V = lwh$ , so  $V = 12 \times 8 \times 3 = 288$  cu ft. Find the volume of one of the blocks:  $V = lwh$ , so  $V = 3 \times 3 \times 2 = 18$  cu ft. Multiply by 4, the number of blocks.  $18 \times 4 = 72$  cu ft Add the main slab to the blocks.  $288 + 72 = 360$  cu ft
- (2) 134** The radius of both the cones and the cylinder is 2. The height of one cone is 4 inches. Find the volume of one cone.  
 $V = \frac{1}{3} \times \pi \times r^2 \times h$   
 $\approx \frac{1}{3}(3.14)(2^2)(4) \approx 16.7$  cu in  
 Multiply by 2 to find the volume to both cones.  $16.7 \times 2 = 33.4$  cu in Find the volume of the cylinder.  
 $V = \pi \times r^2 \times h$

$$\approx 3.14(2^2)(8) \approx 100.48 \text{ cu in}$$

Add to find the total volume.  
 $33.4 + 100.48 = 133.88$  cu in,  
 which rounds to 134 cu in

### Lesson 11: Pythagorean Relationship

#### Practice 11, page 519

- $c = 11.3$  in
- $c = 15$  yd
- $c = 2.5$  cm
- $a = 5.2$  m
- $b = 8$  mm
- $a = 17.3$  ft
- $c = 12.2$  cm
- $b = 26.0$  in
- $c = 6.4$  km
- (2) 6.7** The distance from A to C is 3 units, and the distance from B to C is 6 units.  
 $c^2 = a^2 + b^2$   
 $c^2 = 3^2 + 6^2$   
 $c^2 = 9 + 36$   
 $c^2 = 45$   
 $c = \sqrt{45} \approx 6.7$
- (3) 30** The shorter sides are the legs. Solve for the hypotenuse.  
 $c^2 = a^2 + b^2$   
 $c^2 = 18^2 + 24^2$   
 $c^2 = 324 + 576$   
 $c^2 = 900$   
 $c = \sqrt{900} = 30$
- (4) 12.1** The brace divides the rectangle into two right triangles with the brace as the hypotenuse of each. Solve for the hypotenuse of one of the triangles:  $c^2 = a^2 + b^2$   
 $c^2 = 5^2 + 11^2$   
 $c^2 = 25 + 121$   
 $c^2 = 146$   
 $c = \sqrt{146} \approx 12.08$  which rounds to 12.1
- (2) 36**  
 $c^2 = a^2 + b^2$   
 $39^2 = 15^2 + b^2$   
 $1,521 = 225 + b^2$   
 $1,296 = b^2$   
 $b = \sqrt{1,296} = 36$

### Lesson 12: Using the Formulas Page

#### Practice 12, page 521

- (5)  $\pi$  (7.5<sup>2</sup>)(1.5)** The pond is in the shape of a cylinder, and you need to find the volume. Use the formula: Volume =  $\pi \times \text{radius}^2$



× height. The radius is one-half the diameter:  $15 \div 2 = 7.5$ . The height, in this case, is the depth of 1.5 ft. Volume =  $\pi(7.5^2)(1.5)$

- (4)  $\pi(7.5^2)$  The painting will cover the circular surface that is the bottom of the pond. The measure of the surface is the area. Use the formula: Area =  $\pi \times \text{radius}^2$ . The radius is one-half of 15, or 7.5. Area =  $\pi(7.5^2)$
- (4)  $\sqrt{3^2 + 2^2}$  The antenna frame is at a right angle to the roof, so the diagonal support becomes the hypotenuse of a right triangle. Use the formula:  $c^2 = a^2 + b^2$ , and solve for  $c$ .  $c^2 = 3^2 + 2^2$ , so  $c = \sqrt{3^2 + 2^2}$
- (1)  $8^2 - (4^2 \times \pi)$  The shaded portion is equal to the area of the square minus the area of the circle. The area of the square can be found by squaring the side:  $8^2$ . The area of the circle is found by multiplying pi by the radius squared:  $A = \pi \times 4^2$ . Note that the side of the square equals the diameter of the circle, so the radius of the circle is  $8 \div 2 = 4$ . The correct option is  $8^2 - (4^2 \times \pi)$ .
- (5) 15(14)(7) Volume is measured in cubic footage, and a room is rectangular in shape, so you can solve the problem using the formula  $V = \text{length} \times \text{width} \times \text{height}$ . 15(14)(7)
- (2) 60 + 2(80) Although the doors are in the shape of a rectangle, there is no molding along the bottom of the door. The correct option combines the 60-inch length with twice the 80-inch height of the doors.

### Lesson 13: Using the Calculator

#### Practice 13, page 523

- 42 in
- 195 sq cm
- 43 cu ft
- 15.8 cm
- 37.7 in
- 3014 cm<sup>3</sup>
- (4) 520 Use the formulas for finding the area of a rectangle and the area of a triangle. Press:  $32 \times 20 - 0.5 \times 20 \times 12 = 520$ .

- (2) 35 Use the formula for finding the volume of a cylinder. Press:  $3.14 \times 1.5 \times 2 \times 5 = 35.325$ , which rounds to 35 meters.
- (4) 5,056 Use the formula for finding the volume of a rectangular solid. Subtract the volume of Box B from the volume of Box A. Press:  $26 \times 12 \times 32 - 22 \times 8 \times 28 = 5056$ .
- (3) 608 Use the formula for finding the area of a rectangle. Combine the areas of the two faces. Press:  $32 \times 12 + 28 \times 8 = 608$ .

### Lesson 14: Problem Solving

#### Practice 14, page 525

- (4)  $m\angle 3 + m\angle 6 = 180^\circ$  Lines  $P$  and  $Q$  are parallel, so  $AD$  is a transversal. You know that  $\angle 3$  and  $\angle 4$  are adjacent supplementary angles, so their sum is  $180^\circ$ .  $\angle 4$  and  $\angle 6$  are corresponding angles, so they have equal measures. Since the sum of  $m\angle 3$  and  $m\angle 4$  is  $180^\circ$  and  $m\angle 6 = m\angle 4$ , the sum of  $m\angle 3$  and  $m\angle 6$  must be  $180^\circ$  as well.
- (1)  $m\angle 5 = 60^\circ$   $m\angle ABC$  must equal  $60^\circ$  because the sum of the interior angles of a triangle is  $180^\circ$ , and you know that  $\angle BAC$  measures  $30^\circ$  and  $\angle ACB$  measures  $90^\circ$ .  $180^\circ - 30^\circ - 90^\circ = 60^\circ$  Since lines  $P$  and  $Q$  are parallel, triangles  $ABC$  and  $ADE$  are similar. Angle 5, or  $\angle ADE$ , corresponds to  $\angle ABC$ ; therefore,  $\angle 5$  measures  $60^\circ$ .
- (4)  $\triangle A$  and  $\triangle B$  are not congruent. The remaining statements could be true under certain circumstances, but there is not enough information to draw any of these conclusions. We know for certain that the two triangles cannot be congruent because they have sides of different lengths.
- (2)  $\triangle JKL$  and  $\triangle QRS$  are congruent. We know that the bases of each triangle are the same length (8 units). We know that the triangles share two other sides with the same measure.  $JK$

and  $RS$  both measure 5.7 units. We also know that the angles formed by the two sides have the same measure of  $46^\circ$ . By the Side-Angle-Side rule, we can prove the triangles are congruent.

- (3)  $115^\circ$ ,  $115^\circ$ , and  $65^\circ$  By the definition of a parallelogram, the opposite angle to the one given must measure  $65^\circ$ . We also know that the remaining two angles must have the same measure and that the sum of the interior angles of this quadrilateral must be  $360^\circ$ .  $2x + 65^\circ + 65^\circ = 360^\circ$ , and  $x = 115^\circ$
- (3) 8 You can try each combination of sides in the Pythagorean relationship. Only 6, 8, and 10 will work.
 
$$6^2 + 8^2 = 10^2$$

$$36 + 64 = 100$$

$$100 = 100$$

### Geometry Practice Questions, pages 526–528

- (4)  $\angle 5$  Line  $J$  transverses lines  $S$  and  $T$ . Lines  $J$  and  $K$  are not parallel, so  $\angle 3$  cannot be equal in measure to the angles numbered 9 through 15. Looking only at transversal  $J$ ,  $\angle 3$  is equal in measure to  $\angle 5$  because they are alternate interior angles.
- (2) trapezoid A four-sided figure with only one pair of parallel sides is a trapezoid.
- (3)  $85^\circ$  Angle 10 measures  $95^\circ$ . Since  $\angle 14$  corresponds to  $\angle 10$ , it also measures  $95^\circ$ . Angles 14 and 15 are supplementary angles, so  $m\angle 15 = 180^\circ - 95^\circ = 85^\circ$ .
- (3)  $90^\circ$  The sum of the interior angle measures of any triangle is  $180^\circ$ . Let  $x =$  one of the smaller angles. Let  $2x =$  the largest angle.
 
$$2x + x + x = 180^\circ, \text{ so } 4x = 180^\circ,$$
 and  $x = 45^\circ$ , and the largest angle,  $2x$ , measures  $90^\circ$ .
- (5) 224 A closet is in the shape of a rectangular solid. To find the volume, multiply.
 
$$V = lwh = 7(4)(8) = 224 \text{ cubic feet}$$
- (3) 45 Write a proportion and solve.
 
$$\frac{6}{3\frac{1}{2}} = \frac{x}{26\frac{1}{4}}$$

$$6 \times 26\frac{1}{4} \div 3\frac{1}{2} = 45 \text{ feet}$$

7. **(5) Not enough information is given.** Since  $m\angle 1 = 35^\circ$ , you can find  $180 - 35^\circ = 145^\circ$ . While you can find that the sum of angles 2 and 3 =  $145^\circ$ , there is not enough information to know the measure of either angle 2 or 3 individually.
8. **(2)  $\triangle JKL$  and  $\triangle LMN$  are similar.** Solve for the missing angle in each triangle. Angle  $K$  measures  $42^\circ$ , and angle  $M$  measures  $90^\circ$ . Since the angle measures are equal but the side lengths are not, the triangles are similar.
9. **(2) 500** The distances hiked form a right triangle. The legs are 300 and 400 yards. You must solve for the hypotenuse. You can use the Pythagorean relationship:
- $$a^2 + b^2 = c^2$$
- $$300^2 + 400^2 = c^2$$
- $$90,000 + 160,000 = c^2$$
- $$250,000 = c^2$$
- $$500 = c$$
- You may have noticed that the distances form a large triangle with sides in the 3:4:5 ratio. Therefore, you can see that the hypotenuse of a triangle with legs of 300 and 400 yards is 500 yards.
10. **(4) 168** The volume of the container as drawn in the diagram is  $V = lwh = 9(7)(12) = 756$  cu in. If you increase the length by 2 inches, the volume is  $11(7)(12) = 924$  cu in. Find the difference.  $924 - 756 = 168$  cu in  
You can solve the problem more easily by multiplying the added length by the width and height.  $2(7)(12) = 168$  cu in

11. **(5)  $x^2 = 15^2 - 6^2$**  Use the Pythagorean Relationship. If  $a^2 + b^2 = c^2$  and  $c$  is the hypotenuse, then  $b^2 = c^2 - a^2$  or  $x^2 = 15^2 - 6^2$ .
12. **(4) 36** Use the formula for finding the perimeter of a rectangle. Let  $3w =$  length.  
 $P = 2l + 2w$   
 $96 = 2(3w) + 2w$   
 $96 = 6w + 2w$   
 $96 = 8w$   
 $w = 12$   
 Therefore, the width is 12 inches, and the length is  $3 \times 12 = 36$  inches.
13. **(3)  $\angle 2$  and  $\angle 8$**  Try each option. Angles 2 and 8 are equal in measure because they are alternate exterior angles.
14. **(1) vertical angles** Vertical angles are formed by intersecting lines. They share the same vertex and are located opposite each other.
15. **(2)  $\frac{120}{50} = \frac{AB}{62}$**  Set up the proportion in the way that makes sense to you. Then figure out what operations will be necessary to solve it. If you set up the proportion correctly, you will need to multiply 120 and 62 and divide by 50. Look at each proportion in the answer choices. Only option (2) would be solved with this series of operations.
16. **(2) 1,560** You may find it helpful to draw a sketch of the room. Two walls measure 40 by 12 feet. Two measure 25 by 12 feet. Find the total area.  $2(40)(12) +$

- $2(25)(12) = 960 + 600 = 1,560$
17. **(3) 12,000** Use the formula  $V = lwh$ . Multiply.  $40(25)(12) = 12,000$
18. **(3)  $56^\circ$**  The sum of  $\angle 1$  and the angle marked  $x$  corresponds to  $\angle 2$ , a right angle.  $m\angle 1$  is  $34^\circ$  because  $\angle 1$  is vertical to an angle measuring  $34^\circ$ .  $x + 34^\circ = 90^\circ$ , so  $x = 56^\circ$
19. **24** It may help to make a sketch. The area of the parallelogram is  $6(10) = 60$  sq cm. To find the base of the triangle, use the formula for finding the area of a triangle and solve for base.  $60 = \frac{1}{2}b(5)$ , so  $12 = \frac{1}{2}b$ , and  $24 = b$

		2	4	
	7	7	7	
0	0	0	0	0
1	1	1	1	1
2	2	●	2	2
3	3	3	3	3
4	4	4	●	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

20. **164** The sum of supplementary angles is  $180^\circ$ , so  $16 + m\angle S = 180^\circ$ , and  $m\angle S = 164^\circ$ .

	1	6	4	
	7	7	7	
0	0	0	0	0
1	●	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	●	4
5	5	5	5	5
6	6	●	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

## FORMULAS

---

### AREA of a:

square	Area = side <sup>2</sup>
rectangle	Area = length × width
parallelogram	Area = base × height
triangle	Area = $\frac{1}{2} \times$ base × height
trapezoid	Area = $\frac{1}{2} \times$ (base <sub>1</sub> + base <sub>2</sub> ) × height
circle	Area = $\pi \times$ radius <sup>2</sup> ; $\pi$ is approximately equal to 3.14.

---

### PERIMETER of a:

square	Perimeter = 4 × side
rectangle	Perimeter = 2 × length + 2 × width
triangle	Perimeter = side <sub>1</sub> + side <sub>2</sub> + side <sub>3</sub>

### CIRCUMFERENCE of a:

circle	Circumference = $\pi \times$ diameter; $\pi$ is approximately equal to 3.14.
--------	--

---

### VOLUME of a:

cube	Volume = edge <sup>3</sup>
rectangular solid	Volume = length × width × height
square pyramid	Volume = $\frac{1}{3} \times$ (base edge) <sup>2</sup> × height
cylinder	Volume = $\pi \times$ radius <sup>2</sup> × height; $\pi$ is approximately equal to 3.14.
cone	Volume = $\frac{1}{3} \times \pi \times$ radius <sup>2</sup> × height; $\pi$ is approximately equal to 3.14.

---

### COORDINATE GEOMETRY

Distance between points =  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ ;  
( $x_1, y_1$ ) and ( $x_2, y_2$ ) are two points in a plane.  
slope of a line =  $\frac{y_2 - y_1}{x_2 - x_1}$ ; ( $x_1, y_1$ ) and ( $x_2, y_2$ ) are two points on  
the line.

---

### PYTHAGOREAN RELATIONSHIP

$a^2 + b^2 = c^2$ ;  $a$  and  $b$  are legs and  $c$  the hypotenuse of a right triangle.

---

### MEASURES OF CENTRAL TENDENCY

mean =  $\frac{x_1 + x_2 + \dots + x_n}{n}$ , where the  $x$ 's are the values for which a mean is desired, and  $n$  is the total number of values for  $x$ .

median = the middle value of an odd number of *ordered* scores, and halfway between the two middle values of an even number of *ordered* scores.

---

### SIMPLE INTEREST

interest = principal × rate × time

### DISTANCE

distance = rate × time

### TOTAL COST

total cost = (number of units) × (price per unit)

---

Reprinted with permission of the GED Testing Service of the American Council on Education.



# Kaplan GED Post-Test Score Conversion Charts

To determine a passing score on the Kaplan GED Post-Tests, you need to meet or exceed a minimum score of 410 on each test AND meet or exceed an average score of 450 on all five of the tests. Scores under 410 are shaded below.

## Language Arts, Writing

**Correct Answers on Part I**      **Combined with the Part II, Essay for an Estimated Score<sup>2</sup>**

	2	3	4
49-50	640	710	800
47-48	560	630	720
45-46	500	570	650
43-44	470	540	630
41-42	460	530	620
39-40	450	520	600
37-38	440	510	590
35-36	430	500	580
33-34	420	490	580
31-32	410	480	570
29-30	410	480	560
27-28	400	470	560
25-26	400	470	550
23-24	390	460	550
21-22	390	460	550
19-20	380	450	540
17-18	380	450	540
15-16	370	440	530
13-14	370	440	520
11-12	360	430	520
9-10	350	420	510
7-8	340	410	500
5-6	310	380	470
3-4	250	320	410
1-2	220	290	380

## Social Studies

**Correct Answers**      **Estimated Score**

49-50	800
47-48	710
45-46	640
43-44	600
41-42	570
39-40	550
37-38	530
35-36	510
33-34	500
31-32	480
29-30	470
27-28	460
25-26	440
23-24	430
21-22	410
19-20	400
17-18	390
15-16	370
13-14	360
11-12	340
9-10	320
7-8	300
5-6	280
3-4	250
1-2	200

## Science

**Correct Answers**      **Estimated Score**

49-50	800
47-48	780
45-46	700
43-44	630
41-42	570
39-40	540
37-38	510
35-36	480
33-34	460
31-32	450
29-30	430
27-28	420
25-26	410
23-24	400
21-22	390
19-20	380
17-18	380
15-16	370
13-14	350
11-12	340
9-10	320
7-8	300
5-6	260
3-4	210
1-2	200

## Language Arts, Reading

**Correct Answers**      **Estimated Score**

39-40	800
37-38	680
35-36	600
33-34	540
31-32	500
29-30	480
27-28	470
25-26	450
23-24	430
21-22	410
19-20	400
17-18	390
15-16	380
13-14	360
11-12	340
9-10	320
7-8	300
5-6	270
3-4	230
1-2	200

## Mathematics

**Correct Answers**      **Estimated Score**

49-50	800
47-48	750
45-46	690
43-44	630
41-42	580
39-40	540
37-38	530
35-36	510
33-34	500
31-32	480
29-30	470
27-28	450
25-26	440
23-24	430
21-22	410
19-20	400
17-18	390
15-16	380
13-14	360
11-12	350
9-10	330
7-8	300
5-6	280
3-4	250
1-2	200

## Have You Passed the Kaplan GED Post-Tests?

Step 1: To determine your score for each test, write the “Number Correct” and the corresponding “Score” in the box below. Check off “Pass” for each test that has a score of 410 or higher.

- If all of your scores are 410 or higher, you have met the minimum score for each test, and you can go on to Step 2.
- If any of your scores are lower than 410, you will need to study more in that test area.

Step 2: To determine your average score for all of the tests, divide the TOTAL Score by 5.

- If the average is 450 or higher, you have passed the GED Post-Tests. CONGRATULATIONS!
- If the average is lower, you need to study more in the test areas with low scores.

	Number Correct	Score	Pass (✓)
Writing			
Reading			
Social Studies			
Science			
Mathematics			
TOTAL			
AVERAGE			

<sup>1</sup>These reflect the minimum scores set by the GED Testing Service for the actual test. Individual states may have higher individual test or average scores. Consult your state Department of Adult Education to determine the passing scores for your state. Also, remember that these are practice tests – results on the actual GED will vary. <sup>2</sup>On the actual GED Test, you must have an essay score of 2 or higher to pass the Writing Test, no matter what your Part I score is.

## DRAMA

# Reading Dialogue and Stage Directions

### Key Ideas

- Dialogue refers to the lines of speech that the characters in a play say. Dialogue moves the plot forward and reveals something about the characters.
- Stage directions are usually in italics and parentheses or brackets. Stage directions give information about the characters' expressions, feelings, and actions.

### GED TIP

When you read the excerpt from a drama on the GED Test, visualize what you read. Imagine you are hearing and seeing actors speak and act out the lines.

Plays can be read on the page as well as performed on the stage. When you read a play, you notice the **dialogue**—the lines that the characters speak. Dialogue moves the plot along by bringing to light the conflict in the play and how it is resolved. The dialogue also reveals—either by stating directly or by implying—how each character thinks or why he or she acts a certain way.

**Stage directions** are set off in some way. They can be enclosed in parentheses ( ) or brackets [ ] and are often also in *italic* type. They provide additional information about how a character is feeling, speaking, or moving.

Use the dialogue and stage directions to understand this scene from a play.

SAM: You can speak loud. Your Mom's not here.

HALLY: Out shopping?

SAM: No. The hospital.

HALLY: But it's Thursday. There's no visiting on Thursday afternoons. Is my Dad okay?

SAM: Sounds like it. In fact, I think he's going home.

HALLY: [*Stopped short by Sam's remark*] What do you mean?

SAM: The hospital phoned.

HALLY: To say what?

SAM: I don't know. I just heard your Mom talking.

HALLY: So what makes you say he's going home?

SAM: It sounded as if they were telling her to come and fetch him.

*Hally thinks about what Sam has said for a few seconds.*

HALLY: When did she leave?

SAM: About an hour ago. She said she would phone you. Want to eat?

*Hally doesn't respond.*

From "MASTER HAROLD" . . . AND THE BOYS by Athol Fugard, copyright © 1982 by Athol Fugard. Used by permission of Alfred A. Knopf, a division of Random House, Inc.

► What is revealed when Hally says, "There's no visiting on Thursday afternoons. Is my Dad okay?"

- (1) His father is in the hospital, and Hally is worried something has happened to him.
- (2) Hally fears his parents have been hospitalized.

**Option (1)** is correct. You can conclude that Hally's father is in the hospital, and that Hally fears something is wrong since his mother went on a nonvisiting day.

► What do the stage directions tell you about Hally?

- (1) He is surprised by what Sam has told him.
- (2) He thinks carefully about what he says before he says it.

Again, the correct answer is **(1)**. He is "stopped short" and needs to think a few seconds. Those directions tell you he is surprised by what Sam has told him.

---

## DRAMA ► PRACTICE 1

Questions 1 through 4 refer to the following excerpt from a play.

### ARE BEN AND GUS SATISFIED WITH THEIR WORK?

- BEN: You get your holidays, don't you?  
GUS: Only a fortnight.  
BEN: [*lowering the paper*] You kill me. Anyone would think you're working every day. How often do we do a job? Once a week? What are you complaining about?  
(5) GUS: Yes, but we've got to be on tap though, haven't we? You can't move out of the house in case a call comes.  
(10) BEN: You know what your trouble is?  
GUS: What?  
BEN: You haven't got any interests.  
GUS: I've got interests.  
BEN: What? Tell me one of your interests.  
(15) *Pause.*  
GUS: I've got interests.  
BEN: Look at me. What have I got?  
GUS: I don't know. What?  
BEN: I've got my woodwork. I've got my model boats. Have you ever seen me idle? I'm never idle. I know how to occupy my time, to its best advantage. Then when a call comes, I'm ready.  
(20) GUS: Don't you ever get a bit fed up?  
BEN: Fed up? What with?  
(25) *Silence.* BEN reads. GUS feels in the pocket of his jacket, which hangs on the bed.  
GUS: You got any cigarettes? I've run out.  
*The lavatory flushes off left.*  
There she goes.  
(30) GUS sits on his bed.  
No, I mean, I say the crockery's good. It is. It's very nice. But that's about all I can say for this place. It's worse than the last one. Remember that last place we were in? Last time, where was it? At least there was a wireless there. No, honest. He doesn't seem to bother much about our comfort these days.  
(35) BEN: When are you going to stop jabbering?  
GUS: You'd get rheumatism in a place like this, if  
(40) you stay long.

BEN: We're not staying long. Make the tea, will you? We'll be on the job in a minute.

From THE DUMB WAITER by Harold Pinter. Used by permission of Grove/Atlantic, Inc. Copyright © 1960 by Harold Pinter.

1. What do Ben and Gus generally do on the job?
  - (1) feel under pressure to work hard
  - (2) think of ways to ask for more money
  - (3) look for better jobs
  - (4) sit and wait for work
  - (5) meet to discuss each week's work
2. According to Ben, what is Gus's problem?
  - (1) He has no outside interests.
  - (2) He has been on this job too long.
  - (3) The boss doesn't like him.
  - (4) The job is too hard for him.
  - (5) He talks too much.
3. Which of the following can be inferred about Ben's behavior?

He is

  - (1) pacing back and forth
  - (2) paying only partial attention to Gus
  - (3) trying to quit smoking
  - (4) making tea to spend the time
  - (5) trying to avoid work
4. How does Ben feel about his job?
  - (1) overjoyed
  - (2) impatient
  - (3) angry
  - (4) unconcerned
  - (5) content

**Answers and explanations start on page 662.**

## DRAMA

# Understanding Dramatic Action

### Key Ideas

- Dramatic action moves the plot of a play.
- The dramatic action is revealed in the dialogue and the actions of the characters.
- Sometimes characters' actions are stated in stage directions. Often you have to infer their actions.

### GED TIP

When you read a question on the GED Test, try to answer it yourself first. Look back at the passage if you need to. Then look for an option that says basically the same thing as your answer.

Like a novel or other story, a play has a **plot**. The plot is the series of events that involves a conflict and produces tension. It eventually ends with a resolution of the conflict.

**Dramatic action** refers to the events that move the plot along. In a play, dramatic action is revealed in the dialogue and in the actions of the characters. Sometimes the stage directions tell you the characters' actions. When they do not, you need to picture for yourself how characters would move and act as they were saying their lines.

As you read the following excerpt from a play, focus on what is happening and the conflict that is occurring.

MRS. WARREN [*distracted, throwing herself on her knees*]: Oh no, no. Stop, stop. I am your mother: I swear it. Oh, you can't mean to turn on me—my own child! it's not natural. You believe me, don't you? Say you believe me.

VIVIE: Who was my father?

MRS. WARREN: You don't know what you're asking. I can't tell you.

VIVIE [*determinedly*]: Oh yes you can, if you like. I have a right to know; and you know very well that I have that right. You can refuse to tell me, if you please; but if you do, you will see the last of me tomorrow morning.

MRS. WARREN: Oh, it's too horrible to hear you talk like that. You wouldn't—you couldn't leave me.

VIVIE [*ruthlessly*]: Yes, without a moment's hesitation, if you trifle with me about this.

Excerpt from MRS. WARREN'S PROFESSION by George Bernard Shaw, reprinted courtesy of The Society of Authors on behalf of the Bernard Shaw Estate.

► What initially upsets Mrs. Warren?

- (1) Her daughter asks who her father is.
- (2) Her daughter questions whether Mrs. Warren is her real mother.

You are correct if you chose **(2)**. Mrs. Warren is so upset that she throws herself to her knees and begs for her daughter to believe her.

► What does Vivie do that increases the tension?

- (1) She threatens to leave her mother.
- (2) She threatens to go find her father.

You are correct if you chose **(1)**. Vivie's words "you will see the last of me tomorrow morning" make the conflict between her mother and herself even more tense. Mrs. Warren calls the words "horrible," and Vivie responds "ruthlessly."

## DRAMA ► PRACTICE 2

Questions 1 through 3 refer to the following excerpt from a play.

### WHAT NEWS IS EVERYONE GOSSIPING ABOUT?

- TIM CASEY: Some dispute I suppose it was that rose between Jack Smith and Bartley Fallon, and it seems Jack made off, and Bartley is following him with a hayfork!
- (5) MRS. TARPEY: Is he now? Well, that was quick work! It's not ten minutes since the two of them were here, Bartley going home and Jack going to the Five Acre Meadow; and I had my apples to settle up, that Jo Muldoon of the police had scattered, and when I looked round again Jack Smith was gone, and Bartley Fallon was gone, and Mrs. Fallon's basket upset, and all in it strewed upon the ground—the tea here—the two pound of sugar there—
- (10) the eggs-cups there—Look, now, what a great hardship the deafness puts upon me, that I didn't hear the commencement of the fight! Wait till I tell James Ryan that I see below; he is a neighbour of Bartley's, it would be a pity if he wouldn't hear the news!
- (15) [She goes out. Enter SHAWN EARLY and MRS. TULLY.]
- TIM CASEY: Listen, Shawn Early! Listen, Mrs. Tully, to the news! Jack Smith and Bartley Fallon had a falling out, and Jack knocked Mrs. Fallon's basket into the road, and Bartley made an attack on him with a hayfork, and away with Jack, and Bartley after him. Look at the sugar here yet on the road!
- (20) (25) SHAWN EARLY: Do you tell me so? Well, that's a queer thing, and Bartley Fallon so quiet a man!
- MRS. TULLY: I wouldn't wonder at all. I would never think well of a man that would have that sort of a mouldering look. It's likely he has overtaken Jack by this.
- (30) (35) [Enter JAMES RYAN and MRS. TARPEY.]
- JAMES RYAN: That is great news Mrs. Tarpey was telling me! I suppose that's what brought the police and the magistrate up this way. I was wondering to see them in it a while ago.
- (40)

- SHAWN EARLY: The police after them? Bartley Fallon must have injured Jack so. They wouldn't meddle in a fight that was only for show!
- (45) MRS. TULLY: Why wouldn't he injure him? There was many a man killed with no more of a weapon than a hayfork.
- JAMES RYAN: Wait till I run north as far as Kelly's bar to spread the news!
- (50) [He goes out.]

From *Spreading the News* by Lady Augusta Gregory.

1. What conclusion does Tim Casey jump to about Mrs. Fallon's basket turning over?
  - (1) The police overturned it.
  - (2) Mrs. Tarpey accidentally upset it.
  - (3) Mrs. Fallon threw it at Jack Smith.
  - (4) It happened during a fight.
  - (5) The basket was too heavy to carry.
2. What effect has Mrs. Tully's comment "There was many a man killed with no more of a weapon than a hayfork" (lines 47–49)?
  - (1) It gives Bartley the idea to kill Jack.
  - (2) It persuades people that hayforks are unsafe.
  - (3) It gets the others excited enough to run and tell more people.
  - (4) It makes the others realize that the police should be called to prevent a murder.
  - (5) It recalls what a violent village they live in.
3. Later in the play, Shawn Early reports to Mrs. Tarpey that he saw Jack Smith's wife "laying out a sheet on a hedge" to dry it. Mrs. Tarpey misunderstands and thinks he said "laying out a sheet for the dead."

Based on Mrs. Tarpey's behavior in this excerpt, what will she likely do next?

  - (1) ask Shawn if she heard him correctly
  - (2) mind her own business
  - (3) say a silent prayer
  - (4) tell people that Jack Smith is dead
  - (5) go to Jack Smith's wife to sympathize

Answers and explanations start on page 662.



### Key Ideas

- Characters are the people in a play.
- The thoughts, feelings, motives, and personalities of characters are revealed through dialogue and stage directions.

### GED TIP

Before you read the GED drama excerpt, glance down the left side to see the characters' names. This will tell you how many characters you'll read about and will familiarize you with the excerpt.

## DRAMA

# Analyzing Characters

**Characters** are, of course, the people in a play. Through the dialogue and the stage directions, you learn what each character says and does. You can also learn of the characters' thoughts, feelings, motives, and personalities by reading the lines or by reading "between the lines"—that is, by inferring. Pay attention, too, to what other characters say about a particular character. Their words will give you insight into that character's motives and personality.

As you read the following excerpt from a play, decide what kind of people the two characters are.

WAITER: No one eats here who cannot pay for his food.

WORKMAN: [*Opening his wallet.*] Feast your eyes on that wad. Is that the real cabbage, or isn't it? The real lettuce, the real spinach, the real scratch?

[*Allowing the WAITER to remove some bills and examine them.*]

WORKMAN: [*Cont'd.*] Well, what do you say? Is it good enough for you, or do you want me to pick myself up and walk out of here? Plenty of other restaurants I could go to.

WAITER: No need to raise your voice, sir. I can tell the genuine from the fraud.

WORKMAN: Then get me what I want to eat! I'm hungry and I want to eat!

WAITER: [*Clicking his heels.*] Of course. I am at your service.

WORKMAN: I've been driving all morning in from the border, and my stomach is empty.

WAITER: I understand. You have the money to pay and I am at your service.

From *Cannibal Masque* by Ronald Ribman. Used by permission of Flora Roberts, Inc.

► What does the statement "Feast your eyes on that wad" suggest about the workman?

- (1) He is brash and boorish.
- (2) He is friendly and inviting.

**Option (1)** is correct. The workman demands that the waiter admire the money in his wallet. That tells you the workman is boldly confident and proud of himself, or brash. That action is also an example of bad manners, or boorish behavior.

► Which of the following best characterizes the waiter?

- (1) reserved and obedient
- (2) bitter and resentful

You are correct if you chose **(1)**. The waiter clicks his heels and responds to the workman's demands by agreeing that he, the waiter, is there to serve him. He also speaks in a formal, reserved manner (for example, "No need to raise your voice, sir" and "I am at your service").

## DRAMA ► PRACTICE 3

Questions 1 through 5 refer to the following excerpt from a play.

### HOW DOES SHEILA REACT TO AYAMONN'S INTEREST IN HER?

- AYAMONN: . . . Refuse to let yourself be like a timid little girl safely ensconced in a clear space in a thicket of thorns—safe from a scratch if she doesn't stir, but unable to get to the green grass or the open road unless she risks the tears the thorns can give.
- (5) SHEILA: Oh, Ayamonn, for my sake, if you love me, do try to be serious.
- AYAMONN [*a little wildly*]: Oh, Sheila, our time is not yet come to be serious in the way of our elders. Soon enough to browse with wisdom when Time's grey finger puts a warning speck on the crimson rose of youth. Let no damned frosty prayer chill the sunny sighs that dread the joy of love.
- (10) SHEILA [*wildly*]: I won't listen, Ayamonn, I won't listen! We must look well ahead on the road to the future. You lead your life through too many paths instead of treading the one way of making it possible for us to live together.
- (15) AYAMONN: We live together now; live in the light of the burning bush. I tell you life is not one thing, but many things, a wide branching flame, grand and good to see and feel dazzling to the eye of no-one loving it. I am not one to carry fear about with me as a priest carries the Host. Let the timid tiptoe through the way where the paler blossoms grow; my feet shall be where the redder roses grow, though they bear long thorns, sharp and piercing, thick among them!
- (20) SHEILA [*rising from the chair—vehemently*]: I'll listen no more; I'll go. You want to make me a spark in a mere illusion. I'll go!

Reprinted with the permission of Scribner, a Division of Simon & Schuster, Inc., from RED ROSES FOR ME by Sean O'Casey. Copyright © 1943 by Sean O'Casey; copyright renewed 1971 by Eileen O'Casey, Breon O'Casey, Shivawn Kenig.

1. What does Sheila think about Ayamonn?

- He
- (1) doesn't love her enough
  - (2) doesn't listen to her
  - (3) is impractical and passionate
  - (4) is too demanding
  - (5) is too rough with her

2. Why does Ayamonn say life is "not one thing, but many things" (lines 22–23)?

He believes that life

- (1) has no right or wrong answers
- (2) has too many choices
- (3) has both good and bad in it
- (4) is chaotic and interesting
- (5) provides safety in numbers

3. Which of the following best describes the conflict between Ayamonn and Sheila?

- (1) They have different ideas about love and life.
- (2) Sheila seeks to control Ayamonn.
- (3) Ayamonn thinks Sheila cares too much what other people think.
- (4) Ayamonn refuses to admit Sheila has fallen out of love.
- (5) The two have nothing in common.

4. Based on Ayamonn's words, what kind of occupation does he seem best suited for?

- (1) lawyer
- (2) doctor
- (3) accountant
- (4) businessman
- (5) poet

5. Earlier in the scene, Sheila tells Ayamonn about her mother: "I've told you how she hates me to be near you. She chatters red-lined warnings and black-bordered appeals."

How does this information help explain Sheila's actions in this excerpt?

- (1) She sees Ayamonn only because she wants to rebel against her mother.
- (2) She is fighting her true feelings for Ayamonn because of her mother's feelings.
- (3) She fears Ayamonn will hurt her mother.
- (4) She knows her mother is correct about Ayamonn.
- (5) She fears harm will come to Ayamonn.

Answers and explanations start on page 662.



### Key Ideas

- Drawing conclusions while reading a play means using the information in the dialogue and stage directions to decide something is true.
- You can draw a conclusion about an event in the play as well as about characters' actions, motives, and personalities.

### GED TIP

*A wrong option on the GED Test is very often one that a person who “jumped to a conclusion” might choose. Make sure you can justify the answer you choose with evidence from the passage.*

## DRAMA

### Drawing Conclusions

When you use all the available information to decide something is true, you **draw a conclusion**. For example, if you see a man getting down on one knee while out to dinner with a woman, you could conclude that he is proposing.

When you read a play, you can likewise draw conclusions about the events as well as about characters' actions, motives, and personalities. To draw conclusions, pay attention to the dialogue and stage directions. Consider information that is directly stated as well as inferences you can make. Ask yourself why a character says what she says. Determine what must have happened to explain why a character acts as he does.

As you read this excerpt from a play, see what conclusions you can draw.

LYDIA: Is she still unhappy, Joe?

KELLER: Annie? I don't suppose she goes around dancing on her toes, but she seems to be over it.

LYDIA: She going to get married? Is there anybody. . . ?

KELLER: I suppose . . . say, it's a couple years already. She can't mourn a boy forever.

LYDIA: It's so strange . . . Annie's here and not even married. And I've got three babies. I always thought it'd be the other way around.

KELLER: Well, that's what a war does. I had two sons, now I got one. It changed all the tallies. In my day when you had sons it was an honor. Today a doctor could make a million dollars if he could figure out a way to bring a boy into the world without a trigger finger.

Excerpt from ALL MY SONS by Arthur Miller. Reprinted by permission of International Creative Management, Inc. Copyright © 1947 by Arthur Miller.

- ▶ What is the most likely reason that Annie is not married?
  - (1) Her boyfriend was killed in a war.
  - (2) She is basically an unhappy, withdrawn person.

**Option (1)** is correct. Lydia does ask if Annie is “still unhappy,” but other clues help explain why. The lines “seems to be over it,” “it's a couple years already,” “mourn a boy,” and “that's what a war does” help you draw the conclusion that Annie had a boyfriend who was killed in a war.

- ▶ What type of person does Joe Keller seem to be?
  - (1) angry and negative
  - (2) accepting and down to earth

The correct answer is **(2)**. Although you might conclude that a man who lost a son in a war would be angry, Keller accepts it as a matter of fact (“that's what a war does. I had two sons, now I got one”). He expresses other thoughts in the same down-to-earth manner—“I don't suppose she goes around dancing on her toes” and “say, it's a couple years already. She can't mourn a boy forever.”

## DRAMA ► PRACTICE 4

Questions 1 through 3 refer to the following excerpt from a play.

### WHAT HAPPENED IN THIS HOUSE?

- COUNTY ATTORNEY: Well, that's interesting, I'm sure. [*Seeing the birdcage.*] Has the bird flown?
- (5) MRS. HALE: [*Putting more quilt pieces over the box.*] We think the—cat got it.
- COUNTY ATTORNEY. [*Preoccupied.*] Is there a cat?
- [*MRS. HALE glances in a quick covert way at MRS. PETERS.*]
- (10) MRS. PETERS: Well, not now. They're superstitious, you know. They leave.
- COUNTY ATTORNEY: [*To SHERIFF PETERS, continuing an interrupted conversation.*] No sign at all of anyone having come from the outside. Their own rope. Now let's go up again and go over it piece by piece. [*They start upstairs.*] It would have to have been someone who knew just the—
- (20) [*MRS. PETERS sits down. The two women sit there not looking at one another, but as if peering into something and at the same time holding back. When they talk now it is in the manner of feeling their way over strange ground, as if afraid of what they are saying, but as if they can not help saying it.*]
- (25) MRS. HALE: She liked the bird. She was going to bury it in that pretty box.
- MRS. PETERS: [*In a whisper.*] When I was a girl—my kitten—there was a boy took a hatchet, and before my eyes—and before I could get there—[*Covers her face an instant.*] If they hadn't held me back I would have— [*Catches herself, looks upstairs where steps are heard, falters weakly.*]—hurt him.
- (30) MRS. HALE: [*With a slow look around her.*] I wonder how it would seem never to have had any children around. [*Pause.*] No, Wright wouldn't like the bird—a thing that sang. She used to sing. He killed that, too.
- (40) MRS. PETERS: [*Moving uneasily.*] We don't know who killed the bird.
- MRS. HALE: I knew John Wright.

- MRS. PETERS: It was an awful thing was done in this house that night, Mrs. Hale.
- (45) Killing a man while he slept, slipping a rope around his neck that choked the life out of him.
- MRS. HALE: His neck. Choked the life out of him. [*Her hand goes out and rests on the birdcage.*]
- (50) MRS. PETERS: [*With rising voice.*] We don't know who killed him. We don't know.
- MRS. HALE: [*Her own feeling not interrupted.*] If there'd been years and years of nothing,
- (55) then a bird to sing to you, it would be awful—still, after the bird was still.

Excerpt from TRIFLES, by Susan Glaspell, published by Penguin Putnam, Inc.

1. Who does Mrs. Hale think killed the bird?
  - (1) John Wright
  - (2) Mrs. Peters
  - (3) a strange woman
  - (4) the cat
  - (5) Mrs. Wright
2. Based on the excerpt, which of the following best describes John Wright?
  - (1) a person who is loving and attentive
  - (2) someone who smothers all the joy in another person
  - (3) a person capable of murder
  - (4) an individual who loves animals
  - (5) someone devoted to law and order
3. Which of the following conclusions can you draw about Mrs. Peters and Mrs. Hale?
  - (1) Together they committed murder.
  - (2) Each one thinks the other one is the murderer.
  - (3) They are eager to tell the police all they know.
  - (4) They are afraid the police suspect them.
  - (5) They understand how someone could be driven to murder.

Answers and explanations start on page 662.

## Reading

1. **(1) to contrast Japanese and American eating habits (Analysis)** The live lobster is an example of how close the Japanese are to their food sources. In contrast, the author shows how “distant” Americans are from the sources of the fast food they consume.
2. **(4) flipping a light switch (Application)** Only this option is automatic, routine, and “taken for granted,” just as eating fast food, “brushing your teeth or stopping for a red light” are.
3. **(5) expose the fast-food industry for what it is and its far-reaching effects (Analysis)** The phrase “muck-and-Big-Mac-raking” is a play on the word *muckraking*. The rest of the sentence helps you understand what Schlosser’s muckraking task is.
4. **(2) informal (Synthesis)** Throughout the excerpt are examples of Goodman’s wit on a serious topic, including, “Not only was the tail raw, but it shared the plate with the body to which it had so recently been attached.” Also, her choice of words and phrasing are breezy and informal: “We just take it wrapped and ready.”
5. **(1) Learn how your food is prepared. (Synthesis)** The statement “few of us have any idea where the food comes from, how it gets to the plate, or what’s in it” and Goodman’s explanation of how chicken nuggets are processed help you conclude she would support this rule.
6. **(5) upset or angry with her (Comprehension)** The fourth and fifth paragraphs give examples of Diane’s fear of what his silence indicates.
7. **(4) a mouse (Application)** Diane is timid and insecure. You might even describe her as “mousy.”
8. **(1) Diane makes him act negatively toward her. (Analysis)** When Diane questions the narrator’s every thought and expression, she does not let him be himself; instead, he must constantly reassure her. He therefore begins to feel and act negatively.
9. **(2) resentful (Synthesis)** The tone of the narration is resentful as the narrator describes how Diane “knew from the start how badly I was going to fail her” and in the end begins to criticize her, despite his initial feelings.
10. **(3) He begins to feel toward Diane the way she always feared he did. (Synthesis)** Diane expected the narrator to fail to love her and continually tried to prove her theory. This leads him to begin to “criticize everything about her.”
11. **(2) indifference (Analysis)** The object of the speaker’s love is cold to him; coldness is a way of expressing indifference, or not caring.
12. **(3) Why does she seem less interested the more I pursue her? (Comprehension)** “How comes it then [Why] that this her cold . . . harder grows [does she seem even less interested] the more I her entreat [the more I pursue her]?”
13. **(1) He wants her even more. (Analysis)** The speaker states, “I burn much more” as a result of her coldness.
14. **(3) change the very nature of things (Comprehension)** The final lines of the poem reveal the speaker’s appreciation of love: “it can alter all the course of kind”—in other words, fire and ice, figuratively speaking, do not act as they ordinarily do.
15. **(4) desire and disinterest (Synthesis)** Throughout the poem fire (the speaker’s desire) is contrasted with ice (his love’s disinterest in him).
16. **(1) He hasn’t tried to stop her from getting one. (Comprehension)** In lines 24–25, Mary responds to Mrs. Morehead’s observation that Mary is the one who insists on a divorce, not her husband: “if he hadn’t wanted it, he’d have fought me—”
17. **(5) appeals to Mary’s duty to her family (Analysis)** Mrs. Morehead states that a child needs both parents in one home. Later she argues that fifty years ago women couldn’t get divorces and “they made the best of situations like this . . . [and] made very good things indeed!”
18. **(4) Her husband will miss her and want her back. (Analysis)** You can infer this is Mary’s motive when she says, “Stephen does love me—But he won’t find it out, until I’ve—really gone away.”
19. **(2) discuss the problem with the friend (Application)** Mrs. Morehead seems levelheaded and straightforward in her talk with Mary. She encourages Mary to call off the divorce and go to her husband. She would therefore probably talk to a friend and try to work things out.
20. **(3) Stephen was having an affair with someone at work. (Synthesis)** In the excerpt Mrs. Morehead says, “Have you thought: Stephen might marry that girl?” That coupled with the information about “his private affairs” and “knowing her” and no longer “going stale” help you conclude that the reason Mary is getting a divorce is that Stephen was having an affair.

# Math

## Part I

1. (2) **B** Simplify the fraction:  $-\frac{16}{6} = -2\frac{2}{3}$ ; therefore, the point on the number line must be between  $-2$  and  $-3$ . Only point **B** is at this location.
2. (5) **between 1200 and 1300** The bar for Zone 3 is close to 900, and the bar for Zone 4 is between 300 and 400. Use an estimate such as 330. Combine:  $900 + 330 = 1230$ . Option (5) is correct.
3. (5) **1:2** The bar for Zone 1 seems to be a little less than halfway between 400 and 500; round to 450. The best estimate for the bar for Zone 3 is 900. Make sure you write the ratio in the order stated in the problem. Zone 1:Zone 3 = 450:900, which simplifies as 1:2.
4. (3) **4** Substitute and simplify.  
 $2x - (4y - 3) + 5xz$   
 $2(-3) - [4(2) - 3] + 5(-3)(-1)$   
 $-6 - [8 - 3] + 15$   
 $-6 - 5 + 15$   
 $-11 + 15$   
**4**
5. **36**  
The tower, the pole, the ground, and the sight line along the tops of the pole and tower form two similar right triangles. Use proportion to find the height of the tower.  
$$\frac{\text{base from tower}}{\text{base from pole}} = \frac{\text{height of tower}}{\text{height of pole}}$$
$$\frac{95}{5} = \frac{x}{2}$$
$$95(2) = 5x$$
$$190 = 5x$$
$$x = 38 \text{ meters}$$
6. **70**  
In a parallelogram, the opposite angles are equal; therefore, if one obtuse angle measures  $110^\circ$ , its opposite also measures  $110^\circ$ . The sum of the interior angles of any quadrilateral is  $360^\circ$ . Thus, the sum of the two acute angles equals  $360^\circ - 2(110^\circ) = 360^\circ - 220^\circ = 140^\circ$ . Since both acute angles have the same measure, one of the angles measures  $140^\circ \div 2 = 70^\circ$ .

7. (1) **18** If the face of each cabinet is a rectangle, then the cabinet is in the shape of a rectangular solid. To find the volume, use the formula  $\text{Volume} = \text{length} \times \text{width} \times \text{height}$ . To work the problem in cubic feet, change the inch measurements to feet.  
 $24 \text{ in} \times 72 \text{ in} \times 18 \text{ in} = 2 \text{ ft} \times 6 \text{ ft} \times 1.5 \text{ ft} = 18 \text{ cu ft}$
8. (3) **\$157.50** Both have the same discount rate. You can find the discounts first and then add the discounted price of each cabinet, or add first and find the discount for the total.  
 $\$90 + \$120 = \$210$  original price  
 $\$210 \times 0.25 = \$52.50$  discount  
Subtract the discount.  
 $\$210 - \$52.50 = \$157.50$
9. (4) **16** Divide 10 by  $\frac{3}{5}$ .  
 $10 \div \frac{3}{5} = 10 \times \frac{5}{3} = \frac{50}{3} = 16\frac{2}{3}$   
Decide what to do with the fraction part of the answer. The answer would round to 17 bowls, but the potter can complete only 16 bowls. There isn't enough left to make a 17th complete bowl.
10. (2) **3** The problem doesn't tell you anything about the actual number of hours Janelle will work, but it does tell you how her time spent at one activity compares to another. If she works 100 hours, she will spend 44 hours working at the counter, 9 hours processing new books, and 6 hours repairing bindings. Compare 44 to 15. The number 44 is about 3 times as great as 15.
11. (2) **\$2600** Let  $x$  = the amount Matthew earns and  $x + \$520$  = the amount Levy earns. Write an equation and solve.  
 $x + x + \$520 = \$4680$   
 $2x + \$520 = \$4680$   
 $2x = \$4160$   
 $x = \$2080$   
If Matthew earns \$2080, then Levy earns  $\$2080 + \$520 = \$2600$ .
12. (1)  $\frac{1}{3}(3.14)(2^2)(6)$  The formula for finding the volume of a cone is  $\text{Volume} = \frac{1}{3} \times \pi \times \text{radius}^2 \times \text{height}$ . Substitute the values

from the diagram and select the correct option. Since the diameter is 4 inches, the radius is 2 inches. The correct option is  $\frac{1}{3}(3.14)(2^2)(6)$ .

13. (2,4) Sketch a coordinate grid, and plot the points given in the problem. Then determine the location of the fourth vertex. Plot the correct coordinates.

## Part II

1. (3) **160** Using the percent formula (part = rate  $\times$  base), solve for the total (base).  $24 = 0.15b$   
Divide.  $24 \div 0.15 = 160$
2. (5)  **$8^2 + 9^2 = x^2$**  The distances that Jill drives are the legs of a right triangle. Use the Pythagorean relationship to find the way to solve for the hypotenuse ( $x$ ).  
 $a^2 + b^2 = c^2$   
 $8^2 + 9^2 = x^2$
3. (2)  **$18 - 2x$**  Simplify as follows.  
 $4x - 2(3x - 9)$   
 $4x - 6x + 18$   
 $-2x + 18$ , which equals  $18 - 2x$
4. (3) **21** One way to solve the problem is to find a number that is evenly divisible by 6 and 14, and then try each answer option. Go through the multiples of 14 until you find one that is divisible by 6: 14, 28, 42. The number 42 is divisible by both 14 and 6. Then review the answer choices. 42 cannot be evenly divided by 8, 12, 28, or 35. It can be evenly divided by 21.
5. **40**  
Angle  $a$  is a vertical angle to the angle that measures  $40^\circ$ , and vertical angles are equal.
6. **13**  
Work backward through the facts. Sheila has worked 10 years. Kathy has worked half as long as Sheila, which equals 5 years. Alice has worked 8 years longer than Kathy.  $5 + 8 = 13$  years

7. (4)  $\frac{3}{4}$  Two sections, which equal  $\frac{2}{8}$  or  $\frac{1}{4}$ , are marked "blue." Thus, the chance of not getting blue is  $1 - \frac{1}{4} = \frac{3}{4}$ .
8. (2)  $\frac{\$30(100)}{\$290}$  To find percent of change, divide the amount of change ( $\$290 - \$260 = \$30$ ) by the original price ( $\$290$ ). Each choice is multiplied by 100 to change the result from a decimal to a percent.
9. (3) 5.5 The median is the middle of the data. Arrange the numbers of accounts in order: 2, 4, 4, 4, 5, 6, 6, 7, 7, 8. The middle numbers are 5 and 6. When there

are two numbers in the middle, find the mean of the numbers.  
 $5 + 6 = 11$ , and  $11 \div 2 = 5.5$

10. (5) 4 This is a quadratic equation. You can factor the equation and solve for  $x$ , but the quickest way to solve the problem is to try each answer option in the equation.

$$\begin{aligned} 3x^2 - 10x &= 8 \\ 3(4^2) - 10(4) &= 8 \\ 3(16) - 40 &= 8 \\ 48 - 40 &= 8 \\ 8 &= 8 \end{aligned}$$

11. (5) **Not enough information is given.** You need to know how

many pages are in each program in order to multiply the number of pages per program by cost by number of programs. You are not given that information.

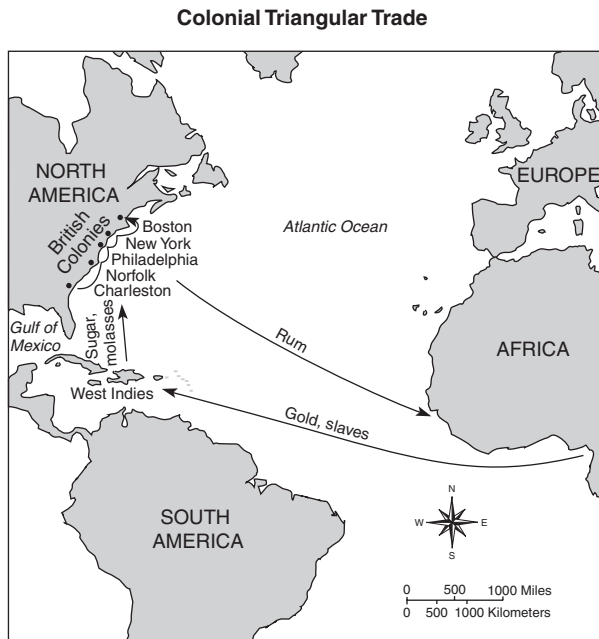
12. (-2,1) Try sketching the information on scratch paper, but be sure to be as accurate as possible in your drawing. Or lightly draw the line segments on the coordinate grid. They intersect at point (-2,1). Be sure to erase completely any stray marks on the grid on the answer sheet.



# GED SOCIAL STUDIES PRETEST

Choose the one best answer to each question.

Questions 1 and 2 refer to the following map.



1. Based on this map, what were the three sides of the triangle in the triangular trade?

- (1) Europe to the West Indies; the West Indies to Africa; Africa to the British colonies
- (2) the West Indies to the British colonies; the British colonies to Africa; Africa to the West Indies
- (3) the West Indies to England; England to the British colonies; the British colonies to Africa
- (4) South America to Africa; Africa to the West Indies; the West Indies to the British colonies
- (5) England to Africa; Africa to South America; South America to the West Indies

2. Which statement is a conclusion based on the map rather than a supporting detail from the map?

- (1) Cargo ships never had to sail empty on any leg of a profitable triangular journey.
- (2) The journey of Africans from Africa to the Americas was called the Middle Passage.
- (3) Slaves sometimes sailed on cargo ships from the West Indies to the British colonies.
- (4) Rum was shipped from one of the ports on the east coast of North America.
- (5) Gold was shipped from Africa to the Americas.

Question 3 refers to the following information.

Several types of U.S. banking institutions and some of their main services are described below.

**Federal Reserve Banks** The central banking system of the United States, used by the federal government to control the money supply

**Commercial banks** Provide checking accounts, savings accounts, and loans for businesses and consumers

**Investment banks** Provide long-term financing to businesses by underwriting, distributing, and trading stocks and bonds

**Savings banks** Provide savings accounts, checking accounts, and home mortgage loans to consumers

**Credit unions** Provide savings accounts, often at a higher rate of interest, and make home mortgage loans, often at a lower rate of interest, to people who are members

3. At which type of banking institution would a consumer probably get the best deal on her home mortgage?

- (1) Federal Reserve Bank
- (2) commercial bank
- (3) investment bank
- (4) savings bank
- (5) credit union

---

Questions 4 and 5 refer to the following passage from a state agency brochure.

Welcome to the Maximum Recycling Program, which lets you recycle up to 40 percent of your trash. There is no fee for your town to bring recyclables to Smithtown. Your town will save money because your recyclables won't be dumped (for a fee) at the Central Landfill.

Maximum recycling is easy. Here's how:

Blue bin	Glass bottles, metal cans, and plastic containers
Green bin	Paper, thin cardboard, and bagged textiles
Bundles	Newspapers

Put your recycling bins out for pickup on the same day as trash collection.

4. Which incentives to recycle does the state resource recovery agency emphasize?
- (1) cleaning up the environment and conserving resources for the future
  - (2) conserving resources for the future and saving the town money
  - (3) saving the town money and making recycling convenient
  - (4) making recycling convenient and reducing the total amount of material put out for pickup
  - (5) reducing the total amount of trash and increasing the number of trash collection days
5. Which of the following actions would probably increase the rate of household participation the most?
- (1) requiring that households bring their recyclables to a collection center
  - (2) requiring that households remove labels as well as lids from containers
  - (3) charging the town a fee for bringing recyclables to the Smithtown facility
  - (4) fining each household that mixes its recyclables in with the regular trash
  - (5) distributing another brochure about the Maximum Recycling Program

6. Most Americans believe it is their civic duty to take part in the political system.

Which of the following actions represents participation in the political system?

- (1) pursuing higher education
- (2) displaying the American flag
- (3) volunteering at a hospital
- (4) starting a local business
- (5) serving on a jury

7. In many Latin American countries, control passes back and forth between military and civilian rule. Generally, when a civilian government rules, it tries to improve conditions for the nation's citizens, but these attempts lead to turmoil and civil unrest. In response, the military takes power and imposes strict controls on the populace. Such shifts have taken place in Argentina, Peru, and Chile in recent decades.

Which of the following is highly valued by those who favor military rule?

- (1) social welfare
- (2) freedom
- (3) democracy
- (4) law and order
- (5) the right to privacy



---

Questions 8 and 9 refer to the following chart.

Presidential Powers in Several Nations

Constitutional Power	U.S.A.	South Africa	France	Mexico	Egypt
Controls armed forces	✓		✓	✓	✓
Approves legislation	✓	✓	✓	✓	✓
Appoints executive branch officials	✓	✓	✓	✓	✓
Appoints judges	✓	✓	✓	✓	
Appoints prime minister			✓		✓
Dissolves legislature			✓		

8. What is the main difference between the powers of the U.S. and South African presidents?
- (1) The U.S. president controls the armed forces and the South African president does not.
  - (2) The U.S. president approves legislation and the South African president does not.
  - (3) The U.S. president appoints judges and the South African president does not.
  - (4) The U.S. president appoints executive branch officials and the South African president does not.
  - (5) The U.S. president can dissolve the legislature and the South African president cannot.
9. Which of the following statements is a conclusion based on the chart rather than a detail?
- (1) The president of Egypt has the power to appoint a prime minister.
  - (2) Of all the presidents shown, the French president has the most power.
  - (3) The president of Mexico has the power to appoint judges.
  - (4) The U.S. president has the power to approve legislation.
  - (5) The presidents of both South Africa and France have the power to dissolve the legislature.

---

Question 10 refers to the following paragraph.

After the Civil War, southern states passed Jim Crow laws, which kept whites and blacks apart in public places like restaurants, buses, and rest rooms. In an 1896 case, *Plessy v. Ferguson*, the U.S. Supreme Court upheld a Louisiana law requiring separate railroad cars for white and black passengers. The court ruled that it was constitutional to have “separate but equal” facilities for whites and blacks and other minorities. The Court reasoned that “Legislation is powerless to eradicate racial instincts or to abolish distinctions.” One justice dissented, saying that the decision was “inconsistent with the personal liberty of citizens, white and black.”

10. Which of the following statements is an opinion rather than a fact?
- (1) In the late 1800s, many southern states passed Jim Crow laws to keep whites and blacks separate in public places.
  - (2) In Louisiana, a law required separate railroad cars for white and black passengers.
  - (3) *Plessy v. Ferguson* was an 1896 Supreme Court case that challenged the Louisiana law related to segregated railroad cars.
  - (4) The U.S. Supreme Court upheld Louisiana’s right to enact laws that provided for separate but equal public facilities.
  - (5) The U.S. Supreme Court ruling in *Plessy v. Ferguson* was wrong because it infringed on freedoms guaranteed in the Constitution.

11. The Global Positioning System can pinpoint any location on Earth. Twenty-four GPS satellites orbit Earth, transmitting signals that can be picked up by anyone with a GPS receiver anywhere on the planet. A basic handheld GPS receiver gives its location in terms of degrees of latitude and longitude on the global grid.

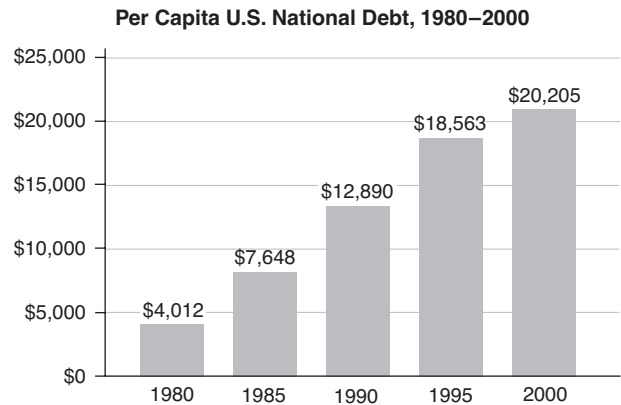
Michael bought a basic handheld GPS receiver because he thought it would help him find his way around Los Angeles. Why wasn't this type of GPS receiver very useful for this purpose?

- (1) GPS satellites do not orbit over Los Angeles.
- (2) The GPS receiver transmitted faulty signals.
- (3) The latitude and longitude grid does not extend over urban areas.
- (4) Knowing only latitude and longitude does not help a person get around a city.
- (5) Los Angeles is a huge city with a complex street pattern.

Questions 12 and 13 refer to the following paragraph and graph.

When the U.S. government cannot cover its expenses, it borrows money by selling bonds. It pays back the principal and interest on the bonds over a period of many years. The national debt is the total amount the U.S. government owes at any particular point in time. In 2000, this was about \$5.7 trillion.

One way of measuring the national debt is by computing the per capita national debt. The per capita national debt is total national debt divided by the population of the United States. The graph in column 2 shows figures for the per capita national debt every five years from 1980 to 2000.



SOURCE: U.S. Bureau of the Census and *Statistical Abstract of the United States*.

12. Which of the following conclusions is supported by the data in the paragraph and the graph?

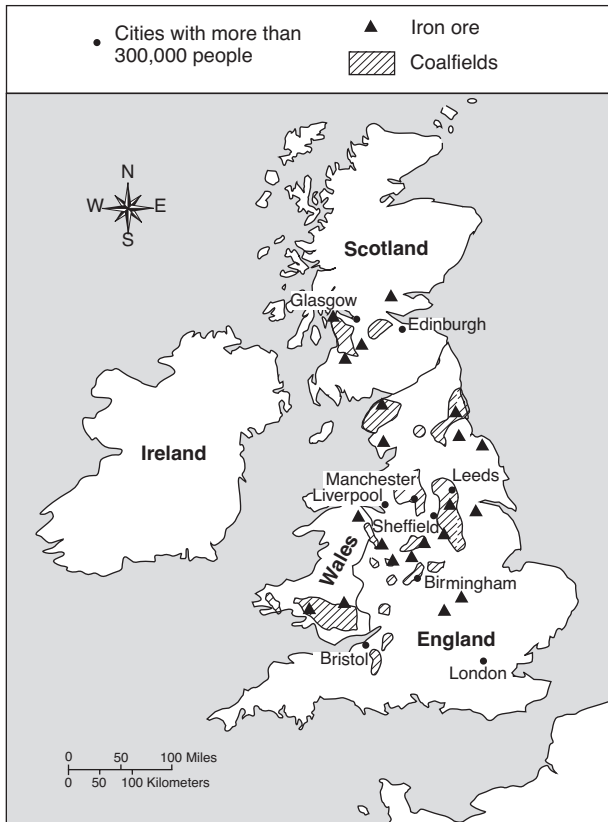
- (1) The per capita national debt tripled between 1980 and 2000.
- (2) The nation's debt increased at a faster rate than did the U.S. population during the period shown on the graph.
- (3) Every person in the United States owed an average of \$20,000 to the government in the year 2000.
- (4) In 1980, the U.S. government owed every American about \$4,000.
- (5) The U.S. government sold about \$5.7 trillion worth of bonds in 2000.

13. Which action would enable the U.S. government to pay off the debt?

- (1) declare bankruptcy
- (2) pay interest to foreign investors
- (3) pay interest to U.S. investors
- (4) raise taxes
- (5) raise social security payments

Question 14 refers to the following map.

Great Britain During the Industrial Revolution, 1830



14. Which of the following is a conclusion based on the map rather than a supporting detail from the map?

- (1) The Industrial Revolution took place in Great Britain around the year 1830.
- (2) More than 300,000 people lived in Sheffield around 1830.
- (3) Many cities had large populations because nearby coal and iron ore deposits meant jobs.
- (4) There was a large area with coal deposits in southern Wales about 1830.
- (5) Glasgow, Scotland, was very close to areas that had coalfields and iron ore deposits.

15. When a nation follows a policy of appeasement, it makes concessions to an aggressor in order to preserve the peace.

Which of the following is an example of appeasement?

- (1) Italy's support of Spanish Nationalists in the Spanish Civil War in the late 1930s
- (2) Great Britain's acceptance of Germany's takeover of Austria and Czechoslovakia in the late 1930s
- (3) Germany's 1939 invasion of Poland, which started World War II
- (4) Japan's alliance with Germany and Italy in 1940, creating the Rome-Berlin-Tokyo Axis
- (5) The United States moving the Pacific fleet to Pearl Harbor early in 1941 in reaction to Japanese aggression in Asia

Questions 16 through 18 refer to the following poster.



Source: From the poster collection of the Library of the American Legion National Headquarters, Indianapolis, Indiana

16. The person who designed this poster used irony to make a point. Behind this irony was an assumption with which the designer expected viewers to agree.

Which of the following statements summarizes this assumption?

- (1) People will give to the war effort because they are doing well economically.
- (2) Financing the war requires selling bonds and raising taxes.
- (3) During wartime, people have little money to spend on their sons.
- (4) People value the lives of their children more than they value money.
- (5) A quick end to the war will save soldiers' lives.

17. During which war was this poster part of a government advertising campaign?

- (1) the Civil War
- (2) World War I
- (3) World War II
- (4) the Vietnam War
- (5) the Persian Gulf War

18. If the government were running a similar advertising campaign today, which medium would probably be most effective?

- (1) posters
- (2) leaflets and brochures
- (3) print ads in financial newspapers
- (4) radio ads on classical stations
- (5) television ads at prime time

Question 19 refers to the following chart.

The Five Most Populous American Colonies, 1750

Colony	Population (estimate)
Massachusetts	188,000
Pennsylvania	119,700
Connecticut	111,300
Maryland	141,000
Virginia	231,000

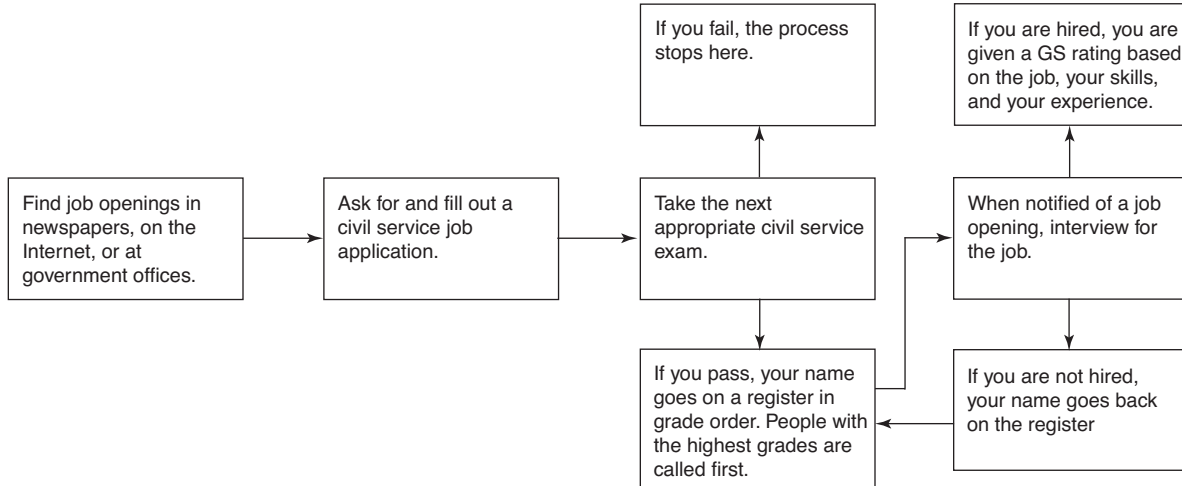
SOURCE: U.S. Bureau of the Census.

19. Which of the following statements is supported by the data in the chart?

- (1) The population of all of the American colonies was less than 700,000.
- (2) Virginia had more than twice as many people as Maryland.
- (3) Most of the population of Massachusetts was of English origin.
- (4) The two most populous colonies were Massachusetts and Pennsylvania.
- (5) The population of the colony of New York was smaller than that of Connecticut.

Questions 20 through 22 refer to the following paragraph and flowchart.

The U.S. Civil Service system is designed to ensure that people are appointed to government positions because of their skills and abilities rather than because of their political affiliation. Over 90 percent of federal jobs are covered by civil service rules. The typical steps in applying for a civil service job are shown below.



20. Which of the following is the best title for the flowchart?

- (1) A History of the Civil Service
- (2) The Qualifications of Civil Service Workers
- (3) Applying for Civil Service Jobs
- (4) Interviewing for a Civil Service Job
- (5) The Politics of the Civil Service

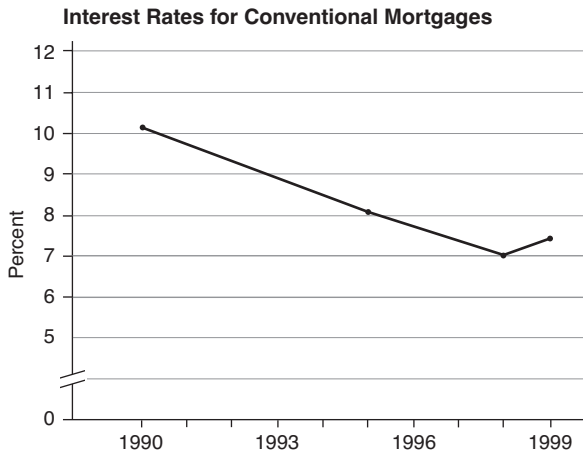
21. What does a civil servant's GS rating probably affect most?

- (1) salary
- (2) length of service
- (3) job security
- (4) education level
- (5) the agency in which the job is located

22. On which of the following values does the structure of the Civil Service system primarily rest?

- (1) patriotism
- (2) equal opportunity
- (3) freedom of speech
- (4) respect for seniority
- (5) loyalty to one's political party

Questions 23 and 24 refer to the following graphs.



SOURCE: U.S. Bureau of the Census.



SOURCE: U.S. Bureau of the Census.

23. In 1995, what were the approximate interest rate and approximate total mortgage debt outstanding for a conventional mortgage?

- (1) 10 percent and \$3,500 billion
- (2) 8 percent and \$4,500 billion
- (3) 7 percent and \$5,000 billion
- (4) 7 percent and \$5,500 billion
- (5) 6 percent and \$6,000 billion

24. In general, based on the graphs, how do mortgage interest rates and total mortgage debt outstanding compare?

- (1) The lower the interest rate, the higher the total mortgage debt outstanding.
- (2) The lower the interest rate, the lower the total mortgage debt outstanding.
- (3) The higher the interest rate, the higher the total mortgage debt outstanding.
- (4) Interest rates rise in direct proportion to increases in total mortgage debt outstanding.
- (5) Interest rates fall in direct proportion to decreases in total mortgage debt outstanding.

25. A culture hearth refers to the center of a culture—the source of its ideas, values, customs, fashions, and practices. An example of an ancient culture hearth was the area along the Nile River in Egypt. The agricultural, economic, social, artistic, and religious ideas and practices that grew up there spread through trade to other areas of the ancient world.

Which of the following is an example of a modern culture hearth with worldwide influence?

- (1) Pyongyang, capital of North Korea, which has a 95 percent literacy rate
- (2) Zaire, which exports gold, diamonds, and other minerals
- (3) Ottawa, capital of Canada, with a population of about one million
- (4) New Zealand, which exports wool and textiles
- (5) Hollywood, California, with its movie and television entertainment industry

**Answers and explanations start on page 50.**



## SENTENCE STRUCTURE

## Complete Simple Sentences

**Key Ideas**

- Make sure each sentence has a subject and verb and expresses a complete thought.
- If a sentence doesn't express a complete thought, you may need to add a subject, verb, or other words.
- Use correct end punctuation.

A complete simple sentence has at least one subject and one verb. The **subject** is the person, place, or thing that the sentence is talking about. The subject performs an action or is described. The **verb** is the word that tells what action the subject is doing or links the subject to a modifier.

**Action verb:** Elaine took notes on the meeting.  
subject verb

**Linking verb:** They were long.  
subject verb modifier

If a sentence is missing either the subject or the verb, it is incomplete. An incomplete sentence is called a **fragment**.

**EXAMPLES**

**No Subject:** Typed up her notes.

**Complete Sentence:** Elaine typed up her notes.

**No Verb:** The computer in the main office.

**Complete Sentence:** The computer in the main office crashed several times.

A complete sentence must also express a complete thought. The reader should not be left asking questions.

**Incomplete thought:** When she lost her work. (What happened when she lost her work?)

**Complete thought:** Elaine was very frustrated when she lost her work.

**Incomplete thought:** The person in charge of computer support. (What about that person?)

**Complete thought:** Elaine called the person in charge of computer support.

**Incomplete thought:** By replacing the hard drive.

**Complete thought:** Elaine can fix the computer by replacing the hard drive.

Finally, a complete sentence should have correct end punctuation. A statement should end with a period, and so should a command. A question should end with a question mark. An exclamation should end with an exclamation point.

**Statement:** Elaine has lost several files this way.

**Command:** Turn off the computer.

**Question:** Will the computer ever be fixed?

**Exclamation:** What a mess we're in!

If you find a fragment in your writing, rewrite to make it a complete sentence.

- If the sentence does not have a subject, add a subject.
- If the sentence does not have a verb, add a verb.
- If the thought is incomplete, add words or combine the incomplete thought with a complete sentence.

**GED TIP**

*Read each sentence in a GED passage to yourself and pause at its end. That may help you "hear" whether the sentence is actually an incomplete thought.*

---

## SENTENCE STRUCTURE ► PRACTICE 1

**A. Directions:** Write *C* if the sentence is complete or *F* if the sentence is a fragment. Rewrite any fragments to make them complete.

**EXAMPLES:**

Talks all the time on the telephone. *F* Dave talks all the time on the telephone.

1. Drives his girlfriend crazy. \_\_\_\_\_
2. As soon as he comes home from work. \_\_\_\_\_
3. He calls everyone he knows. \_\_\_\_\_
4. Dave's sister and his best friend. \_\_\_\_\_

**B. Questions 5 through 7 refer to the following advertisement.**

### What Is Three-Way Calling?

**(A)**

(1) Three-way calling is a unique service that enables you to conduct a conference call. (2) From the privacy of your own home. (3) You can talk to your sister in Florida and your mother in Nebraska at the same time. (4) It's even possible to seek a third person's advice when you're in the middle of a regular call. (5) For instance, if you're closing a deal, can bring your lawyer into the conversation.

**(B)**

(6) Why wait? (7) This useful and convenient service. (8) Can be yours for only pennies a month.

**5. Sentences 1 and 2:** Three-way calling is a unique service that enables you to conduct a conference call. From the privacy of your own home.

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) call. From
- (2) call. And from
- (3) call from
- (4) call, from
- (5) call. It from

**6. Sentence 5:** For instance, if you're closing a deal, can bring your lawyer into the conversation.

Which correction should be made to sentence 5?

- (1) remove the comma after instance
- (2) change closing to to close
- (3) remove the comma after deal
- (4) insert you before can
- (5) no correction is necessary

**7. Sentences 7 and 8:** This useful and convenient service. Can be yours for only pennies a month.

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) service. Can
- (2) service, can
- (3) service it can
- (4) service can
- (5) service. That can

**Answers and explanations start on page 631.**

## SENTENCE STRUCTURE

## Compound and Complex Sentences

**Key Ideas**

- You can join two independent clauses into one compound sentence.
- Use a coordinating conjunction preceded by a comma.
- Choose a conjunction that correctly relates the two ideas.

**Compound Sentences**

The simple sentences described in Lesson 1 are also called **independent clauses**. An independent clause has a subject and a verb and expresses a complete thought. You can join two or more independent clauses in one **compound sentence**. To make a compound sentence, you should:

- Choose a logical **coordinating conjunction** to join the independent clauses. The coordinating conjunctions are *and, but, or, nor, for, so, and yet*.
- Insert a comma before the coordinating conjunction.

**EXAMPLES**

**Two independent clauses:** Sam saw a design flaw. He wrote a memo.

**Joined correctly:** Sam saw a design flaw, so he wrote a memo.

**No coordinating conjunction:** Sam asked his boss, she told him to send it.

**Correct:** Sam asked his boss, and she told him to send it.

**No comma:** Sam's boss was busy so she asked Sam to write the memo.

**Correct:** Sam's boss was busy, so she asked Sam to write the memo.

Be sure the coordinating conjunction expresses the correct relationship between the ideas in the two independent clauses.

Relationship Between Ideas	Coordinating Conjunction
join two equally important ideas	and
contrast two ideas	but, yet
show a cause	for
show an effect	so
give a choice	or
give no choice	nor

**Incorrect conjunction:** Sam showed initiative, **yet** his boss praised him.

**Correct conjunction:** Sam showed initiative, **and** his boss praised him.

Be sure that you are actually joining two independent clauses and not just two subjects or two verbs.

**Incorrect:** The designers, and the builders got the memo.

**Correct (no comma):** The designers and the builders got the memo.

**Incorrect:** The designers needed the information, and they appreciated the memo.

**Correct (two independent clauses):** The designers needed the information, and they appreciated the memo.

**Correct (no comma):** The designers needed the information and appreciated the memo.

**GED TIP**

*Be sure that a coordinating conjunction is separating two independent clauses before you choose the option that inserts a comma before the conjunction.*

---

## SENTENCE STRUCTURE ► PRACTICE 2.1

**A. Directions:** Using the list on page 86, choose a coordinating conjunction for each sentence. On a separate sheet of paper, rewrite the sentence using the conjunction preceded by a comma.

**EXAMPLE:** I didn't want to seem timid, so I didn't tell anyone about my experience.

1. It was late \_\_\_\_\_ I was walking home from work.
2. My co-worker, Judy, had offered to drive me \_\_\_\_\_ I had refused.
3. It was a warm night \_\_\_\_\_ I decided to get some fresh air.
4. It was really my choice. I could have taken a cab \_\_\_\_\_ I could have walked.
5. I heard a loud noise \_\_\_\_\_ I ran the last block to my house. Later, I learned that it was only a car backfiring.

**B. Questions 6 through 8 refer to the following paragraph.**

### Air Couriers

(1) If you want to travel abroad but don't have a lot of money, one option is to be an air courier. (2) An air courier carries shipping documents on an international flight, and gets a cheap ticket in return. (3) Companies use couriers because it often costs less to check freight as baggage than to ship it as cargo. (4) Air couriers fly on the major airlines, so sometimes they can't check any baggage of their own. (5) Couriers usually book their trips in advance but they get their tickets on the day of the flight.

**6. Sentence 2:** An air courier carries shipping documents on an international flight, and gets a cheap ticket in return.

Which correction should be made to sentence 2?

- (1) change carries to carry
- (2) remove the comma
- (3) replace and with but
- (4) change gets to getting
- (5) no correction is necessary

**7. Sentence 4:** Air couriers fly on the major airlines, so sometimes they can't check any baggage of their own.

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) airlines, so
- (2) airlines so
- (3) airlines, but
- (4) airlines but
- (5) airlines, or

**8. Sentence 5:** Couriers usually book their trips in advance but they get their tickets on the day of the flight.

Which correction should be made to sentence 5?

- (1) replace usually with never
- (2) replace book with will book
- (3) insert a comma after advance
- (4) insert a comma after but
- (5) no correction is necessary

**Answers and explanations start on page 631.**



---

## SENTENCE STRUCTURE ► PRACTICE 2.2

A. **Directions:** Join the clauses to form complex sentences. Use the subordinating conjunctions in parentheses.

### EXAMPLE

(if) You buy a smoke detector. You can protect your family.

*If you buy a smoke detector, you can protect your family.*

---

1. Most fatal fires occur. (when) A family is asleep.  

---
2. (because) A smoke alarm wakes you up. It can allow you to escape.  

---
3. Try to replace the smoke detector's battery. (before) It goes dead.  

---
4. (although) Smoke detectors cost money. The expense is worth it.  

---

B. Questions 5 through 7 refer to the following paragraph.

### Phone Etiquette

(1) When you are making a business call, it's wise to keep a few key rules in mind. (2) First of all, be prepared. (3) Have paper and pencil ready so that you won't have to fumble for them. (4) Whenever you identify yourself, ask the person whether this is a good time to talk. (5) Get to the point quickly. (6) Before you hang up. (7) Thank the person for his or her time. (8) Finally, put the phone down gently. (9) Slamming down the receiver makes a poor impression.

5. **Sentence 1:** When you are making a business call, it's wise to keep a few key rules in mind.

Which correction should be made to sentence 1?

- (1) change are making to is making
- (2) replace are with our
- (3) remove the comma
- (4) change it's to its
- (5) no correction is necessary

6. **Sentence 4:** Whenever you identify yourself, ask the person whether this is a good time to talk.

Which correction should be made to sentence 4?

- (1) replace Whenever with After
- (2) remove the comma
- (3) insert a comma after person
- (4) replace the person with them
- (5) no correction is necessary

7. **Sentences 6 and 7:** Before you hang up. Thank the person for his or her time.

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) up. Thank
- (2) up thank
- (3) up, thank
- (4) up and thank
- (5) up, thanking

Answers and explanations start on page 631.



## Key Ideas

- A run-on sentence is two or more sentences that are connected without correct punctuation.
- In a comma splice, two sentences are joined with only a comma.
- To correct a run-on or comma splice, make a compound or complex sentence, or separate the sentences.

### GED TIP

*When you read a run-on sentence, look for places where the reader would naturally pause between ideas. These places are most likely where the sentence needs correction.*

## SENTENCE STRUCTURE

# Run-Ons and Comma Splices

### Run-Ons

There are two errors people commonly make when they join independent clauses to form a sentence. The first type of error is called a **run-on**. In a run-on, two independent clauses are combined without proper punctuation.

**Run-On:** Banks offer many helpful services you should check them out.

You can correct a run-on in one of several ways:

- Break the run-on into two separate sentences.  
**Correct:** Banks offer many services. You should check them out.
- Make a compound sentence (add a coordinating conjunction and a comma).  
**Correct:** Banks offer many services, so you should check them out.
- Make a complex sentence (add a subordinating conjunction and, if necessary, a comma).  
**Correct:** Because banks offer many services, you should check them out.

A run-on can also consist of independent clauses strung together with *and*. Correct this kind of run-on by dividing it into one or more compound sentences or by combining ideas into one sentence.

**Run-On:** Banking is getting more and more convenient and you can check on your account using bank-by-phone services and it's even possible to do your banking on the Internet.

**Correct:** Banking is getting more and more convenient. You can check on your account using bank-by-phone services, and it's even possible to do your banking on the Internet.

**Run-On:** Friday I got paid and I went to the bank and I cashed my check.

**Correct:** Friday I got paid, went to the bank, and cashed my check.

### Comma Splices

The second type of error people sometimes make when joining independent clauses is called a **comma splice**. A comma splice occurs when two sentences are joined with just a comma. To correct a comma splice, add a coordinating conjunction after the comma:

**Comma splice:** You can check on your account using bank-by-phone services, it's even possible to do your banking on the Internet.

**Correct:** You can check on your account using bank-by-phone services, and it's even possible to do your banking on the Internet.

You can also correct a comma splice using the methods described above for correcting a run-on.

**Comma splice:** There are fewer bank tellers today banks do offer other services.

**Corrected by creating a complex sentence:** Although there are fewer bank tellers today, banks do offer other services.

---

## SENTENCE STRUCTURE ► PRACTICE 3

A. **Directions:** Correct the following run-ons and comma splices using the methods explained on page 90. Try to use each method at least once.

1. Jeff just got his driver's license, he's very excited.

\_\_\_\_\_

2. He bought a car that has a lot of miles on it it wasn't very expensive.

\_\_\_\_\_

3. He doesn't have a lot of free time, he'd like to take a car trip.

\_\_\_\_\_

4. He needs to find out about car insurance and he needs to get a good map and he needs to join an auto club.

\_\_\_\_\_

B. Questions 5 through 7 refer to the following paragraphs.

### Photography Tips

#### (A)

(1) It's not hard to take great pictures just keep these tips in mind. (2) For one thing, you need to get close to your subject, or you won't get a good shot. (3) Be patient, wait for the right moment to shoot. (4) Make sure the lighting is sufficient. (5) Even outdoors, you can use a flash to fill in shadows.

#### (B)

(6) Always keep extra film on hand. (7) You can buy it at a drugstore or discount store and it is also available by mail order. (8) Don't forget to keep extra batteries on hand too.

5. **Sentence 1:** It's not hard to take great pictures just keep these tips in mind.

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) pictures just
- (2) pictures if you just
- (3) pictures, if you just
- (4) pictures that just
- (5) pictures that are just

6. **Sentence 3:** Be patient, wait for the right moment to shoot.

Which correction should be made to sentence 3?

- (1) remove the comma
- (2) insert and after the comma
- (3) replace wait with weight
- (4) insert a comma after moment
- (5) no correction is necessary

7. **Sentence 7:** You can buy it at a drugstore or discount store and it is also available by mail order.

Which correction should be made to sentence 7?

- (1) insert a comma after drugstore
- (2) insert a comma after store
- (3) remove and
- (4) replace and with or
- (5) no correction is necessary

**Answers and explanations start on page 631.**

## SENTENCE STRUCTURE

## Subordinating Ideas

**Key Ideas**

- Use smooth, flowing sentences rather than short, choppy sentences.
- Form compound or complex sentences from short sentences.
- Combine two predicates to make a compound predicate, or combine two subjects to make a compound subject.

**GED TIP**

*Read the passages on the GED Writing Test to yourself as if you could hear them in your mind. That “silent hearing” will help you notice sentences that are choppy or repetitive.*

Writing is more effective when it flows smoothly. Therefore, try to eliminate short, choppy sentences whenever possible. You can do this by using **subordination** in a variety of ways.

You already know how to form a complex sentence with a subordinating clause. You also know how to create compound sentences. Either of these methods can be used to combine short sentences.

**EXAMPLES**

**Short and choppy:** Carla ran for the bus. She missed it.

**Complex sentence:** Although Carla ran for the bus, she missed it.

**Compound sentence:** Carla ran for the bus, but she missed it.

If two sentences have the same subject, you can combine them to form one sentence with a compound predicate. The **predicate** includes the verb plus anything else that is not part of the subject:

**Short and choppy:** Carla sat on the bench. She looked at her watch.

**With compound predicate:** Carla sat on the bench and looked at her watch.

Likewise, when two sentences have the same predicate, you can combine them to form one sentence with a compound subject. The resulting sentence will be less repetitive and wordy:

**Short, choppy, and repetitive:** Carla missed the bus. Dave missed the bus, too.

**With compound subject:** Carla and Dave missed the bus.

Finally, several short sentences that are related can be combined into one longer and more detailed sentence:

**Short and choppy:** Carla missed the bus. It was the 7:45 bus. She was on her way to work.

**More detailed sentence:** Carla missed the 7:45 bus on her way to work.

Sometimes, you can use two methods at the same time. For instance, in the sentence below you can make a complex sentence with combined details:

**Short and choppy:** Carla found a pay phone near the bus stop. She called her boss. Then she called one of her co-workers.

**Complex sentence with combined details:** After Carla found a pay phone near the bus stop, she called her boss and one of her co-workers.

**Repetitive:** Her boss thanked her for calling. Her co-worker thanked her for calling, and they both offered to pass along any messages.

**With compound subject and compound predicate:** Both her boss and her co-worker thanked her for calling and offered to pass along any messages.

---

## SENTENCE STRUCTURE ► PRACTICE 4

A. **Directions:** Write each set of short, choppy sentences as one longer, smooth sentence.

### EXAMPLE

If you are in a tornado, keep the windows closed. You should go to a safe place.

*If you are in a tornado, keep the windows closed and go to a safe place.*

---

1. Tornadoes can cause a lot of damage. Earthquakes are also capable of causing a lot of damage.

---

2. Earthquakes are somewhat common in California. Many Californians do not seem to mind.

---

3. On May 3, 1999, there was a tornado. It happened in Kansas. Five people were killed. One hundred fifty people were injured.

---

4. Tornadoes can occur anywhere in the United States. They can happen any time of year.

---

B. Questions 5 through 7 refer to the following warranty.

### Limited Warranty

(1) If there is any defect, Pantronics will repair this unit free of charge. (2) Radios and audio components will be repaired. (3) Repairs will take place up to one year after date of purchase. (4) The unit may be brought to the service center. (5) It can also be mailed. (6) A proof of purchase, such as a receipt, must be presented in order to receive service. (7) This warranty does not cover damage due to accidents. (8) It does not cover damage due to mishandling or faulty installation.

5. **Sentences 2 and 3:** Radios and audio components will be repaired. Repairs will take place up to one year after date of purchase.

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) repaired. Repairs will take place up
- (2) repaired and repairs will take place up
- (3) repaired, the repairs will take place up
- (4) repaired up
- (5) repaired, so the repairs will take place up

6. **Sentences 4 and 5:** The unit may be brought to the service center. It can also be mailed.

The most effective combination of sentences 4 and 5 would include which group of words?

- (1) brought or mailed to
- (2) once brought to the service center,
- (3) units that are mailed to the service center
- (4) to the service center, but
- (5) bringing it to the service center, or mailing

7. **Sentences 7 and 8:** This warranty does not cover damage due to accidents. It does not cover damage due to mishandling or faulty installation.

The most effective combination of sentences 7 and 8 would include which group of words?

- (1) accidents, and it
- (2) accidents, and this warranty
- (3) accidents, and, in addition, it
- (4) accidents, nor does it
- (5) accidents, mishandling, or faulty installation

**Answers and explanations start on page 631.**

## SENTENCE STRUCTURE

## Modifying Ideas

**Key Ideas**

- Modifiers make writing clearer and more interesting.
- Correct a dangling modifier by turning it into a subordinate clause or by making the word that is modified the subject of the sentence.
- Place a modifier as near as possible to the word or phrase it describes.

**ON THE GED**

When a modifying phrase is at the beginning of a sentence, use a comma to separate it from the rest of the sentence. Some GED items may test that use of the comma.

**Modifiers** are words and phrases used to add descriptive details. A modifier might be a word like *sweaty*, a verb phrase like *dragging the heavy box*, a prepositional phrase like *from the storage room*, or a clause like *that we packed this morning*. Modifiers make writing clearer, more specific, and more interesting.

**EXAMPLES**

**Without modifiers:** Our friends Jack and Tina helped us while we were moving.

**With modifiers:** Our good friends Jack and Tina helped us while we were moving, watching our baby in their home.

**Without modifiers:** We realized the weather would not cooperate.

**With modifiers:** Sweating profusely at 9 A.M., we realized the weather would be uncooperatively hot.

Use modifiers carefully, or your meaning will be unclear. A **dangling modifier** is a word or phrase at the beginning of the sentence that has no clear subject to describe. To correct a dangling modifier, turn it into a subordinate clause, or make the word that the modifier describes into the subject of the sentence.

**Dangling modifier:** Driving the truck, one of the boxes fell out. (Who was driving the truck—one of the boxes?)

**Correct:** As we were driving the truck, one of the boxes fell out.

**Correct:** Driving the truck, we heard one of the boxes fall out.

**Dangling modifier:** Parking in a tow zone, a police officer gave us a ticket. (It sounds as if the police officer were parking in the tow zone.)

**Correct:** Because we parked in a tow zone, a police officer gave us a ticket.

**Dangling modifier:** Never having planned a move before, the real estate agent gave us some tips. (It sounds as if the real estate agent is the one who has never planned a move.)

**Correct:** Never having planned a move before, we asked the real estate agent for some tips.

A **misplaced modifier** is poorly placed in the sentence. It is not clear which word it modifies, or it modifies the wrong word in the sentence. To correct a misplaced modifier, put the modifier next to the word it describes.

**Misplaced modifier:** The moving van was just large enough that we rented.

**Correct:** The moving van that we rented was just large enough.

**Misplaced modifier:** We hoisted and lugged all our furniture up two flights of stairs panting heavily. (What was panting heavily—*we* or *the stairs*?)

**Correct:** Panting heavily, we hoisted and lugged all our furniture up two flights of stairs.

---

## SENTENCE STRUCTURE ► PRACTICE 5

A. **Directions:** Revise each sentence, correcting the misplaced or dangling modifier.

1. Trent’s sister encouraged him to become a nurse, who is also a health professional.

---

2. Waking up the patients to take their blood pressure, they get rather annoyed.

---

3. He writes their temperature and blood pressure on their charts carefully.

---

4. Talking with the patients, it is hard to make visitors leave at 9 P.M.

---

B. Questions 5 through 7 refer to the following paragraphs.

### Adoption

#### (A)

(1) Adoption is a legal procedure that gives a person the rights of a son or daughter who is not the birth child of the adopter. (2) This practice dates back to ancient Greece. (3) People without heirs used it to perpetuate their estates.

#### (B)

(4) Adoptions may be handled through an agency or by independent placement. (5) Going through an agency, a “home study” to decide whether prospective parents will be fit is required. (6) In an independent placement, there is no study. (7) Lawyers handle these adoptions when parents ask them to frequently.

5. **Sentence 1:** Adoption is a legal procedure that gives a person the rights of a son or daughter who is not the birth child of the adopter.

The most effective revision of sentence 1 would include which group of words?

- (1) a legal procedure, adoption that gives
- (2) giving legal rights to a person
- (3) a person who is not the birth child
- (4) the son or daughter of the adopter
- (5) the birth child, who is a son or daughter

6. **Sentence 5:** Going through an agency, a “home study” to decide whether prospective parents will be fit is required.

The most effective revision of sentence 5 would begin with which group of words?

- (1) For parents, going through an agency
- (2) Requiring a “home study”
- (3) An agency requires a “home study”
- (4) Deciding whether a parent is fit
- (5) When going through an agency

7. **Sentence 7:** Lawyers handle these adoptions when parents ask them to frequently.

Which correction should be made to sentence 7?

- (1) change handle to handles
- (2) insert a comma after adoptions
- (3) replace to with too
- (4) move frequently to follow Lawyers
- (5) no correction is necessary

**Answers and explanations start on page 631.**



## Key Ideas

- Listed items should be parallel in form and structure.
- Each phrase should have the same elements as other phrases in the series.
- Don't put words and clauses together in the same series.

### GED TIP

*The comma before the and in a list of three or more is optional: hop, skip, and jump or hop, skip and jump. It's best to get in the habit of using that comma, however, so that you don't forget to use commas elsewhere in the series.*

## SENTENCE STRUCTURE

### Parallel Structure

When you write a sentence that lists two or more words, phrases, or clauses, the elements in the list must be in the same grammatical form. In other words, the sentence must have **parallel structure**. Writing that has parallel structure is clearer and easier to follow.

#### Examples

**Not Parallel:** Jim wants to eat less, exercise more, and be getting more sleep.

**Parallel:** Jim wants to eat less, exercise more, and get more sleep.

**Not Parallel:** Walking and to swim are good aerobic exercises.

**Parallel:** Walking and swimming are good aerobic exercises.

**Not Parallel:** Try to lose weight slowly, sensibly, and in a careful way.

**Parallel:** Try to lose weight slowly, sensibly, and carefully.

To be sure that your sentences have parallel structure, follow the guidelines below.

Make sure that verbs in a list are in the same form and tense:

**Not Parallel:** Jim went to the store, bought an exercise mat, and is doing exercises.

**Parallel:** Jim went to the store, bought an exercise mat, and did exercises.

Be sure that phrases in a list are parallel in form and wording. For example, if one phrase in a list begins with a preposition, the others should, too. If one phrase begins with the word *the*, the others should, too.

**Not Parallel:** Avoid exercising on busy streets, near traffic jams, and polluted areas.

**Parallel:** Avoid exercising on busy streets, near traffic jams, and in polluted areas.

**Not Parallel:** He left the gym shoes, sweatpants, and the shirt in the gym.

**Parallel:** He left the gym shoes, the sweatpants, and the shirt in the gym.

Each list must have single words, short phrases, or clauses. Don't put single words and clauses together in the same series:

**Not Parallel:** The most effective fitness programs are low impact, informal, and you can do them at home.

**Parallel:** The most effective fitness programs are low impact, informal, and home-based.

Finally, notice that a comma separates each item within a list of three or more: *low-intensity, informal, and home-based*.

---

## SENTENCE STRUCTURE ► PRACTICE 6

A. **Directions:** Rewrite each sentence to make the structure parallel.

### EXAMPLE

Jenna works quickly, carefully, and in a thorough manner.

*Jenna works quickly, carefully, and thoroughly.*

---

1. Jenna has worked in a factory, a store, and as a waitress.  

---
2. She would like putting her kids in a better school and to get a better job.  

---
3. She thinks the kids' father is irresponsible, lazy, and doesn't care about them.  

---
4. He doesn't have the time, the energy, or money to give them what they deserve.  

---

B. Questions 5 through 7 refer to the following memo.

**TO: All Employees**

**(A)**

(1) A new alarm system has been installed. (2) It is designed to make our workplace safer, more comfortable, and pleasant. (3) However, we need everyone's cooperation.

**(B)**

(4) If you are the last one to leave, turn off all lights, computers, and check the coffee makers. (5) Then go to the alarm system located by the door. (6) Punch in the secret code, press ON, and be leaving immediately. (7) Lock the door behind you.

5. **Sentence 2:** It is designed to make our workplace safer, more comfortable, and pleasant.

Which correction should be made to sentence 2?

- (1) change is to was
- (2) replace our with are
- (3) remove the comma after safer
- (4) insert more before pleasant
- (5) no correction is necessary

6. **Sentence 4:** If you are the last one to leave, turn off all lights, computers, and check the coffee makers.

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) computers, and check the
- (2) computers and checking the
- (3) computers, and to check the
- (4) and computers, and the
- (5) computers, and

7. **Sentence 6:** Punch in the secret code, press ON, and be leaving immediately.

Which correction should be made to sentence 6?

- (1) change punch to punching
- (2) change code to codes
- (3) remove the comma after ON
- (4) change be leaving to leave
- (5) insert a comma after leaving

**Answers and explanations start on page 632.**

## SENTENCE STRUCTURE

Essay Writing Process:  
Revising Your Sentences**Key Ideas**

- Read your work as a whole to make sure that it is clear and logical.
- Imagine that you are reading your work for the first time.
- Correct any sentences that have errors in structure or punctuation.

**GED TIP**

*To prepare for the GED essay, practice prewriting, drafting, and revising often. Frequent practice will help you feel more comfortable and confident as a writer.*

**Revising Unclear and Incorrect Sentences**

When you write an essay, your first step is to get your ideas down on paper. To do this, you follow a prewriting and drafting plan like the ones on pages 74–79. When you are finished drafting, go back and reread what you have written. As you read each sentence, ask yourself:

- Do the ideas in the sentence make sense? If not, how can I make the sentence clearer? Add some words? Drop or move a confusing word or phrase? Insert or delete punctuation? Change the words?
- Is the sentence structure correct? If not, how can I correct it?

Read the paragraph below, and think about how you would revise the errors in clarity and sentence structure. Then compare it with the revised paragraph.

**Paragraph with unclear and incorrect sentences:**

Working outdoors has many advantages over working indoors. When you are outside you are in contact with nature. You can enjoy the sunshine on your face, hear the birds, and to smell the flowers. You don't have to consult the weather forecast on TV. In contrast, sitting in a climate-controlled cubicle, it is not known whether the sky is sunny or cloudy. Also, most outdoor jobs require you to use your body, that can be a huge advantage. Finally, if you work indoors, you might be sitting down at a desk, and typing all day long. After work, instead of relaxing. You'll probably have to go to the gym to work out.

**Paragraph with revised sentence structure:**

Working outdoors has many advantages over working indoors. When you are outside, you are in contact with nature. You can enjoy the sunshine on your face, hear the birds, and smell the flowers. You don't have to consult the weather forecast on TV. In contrast, when you sit in a climate-controlled cubicle, you don't know whether the sky is sunny or cloudy. Also, most outdoor jobs require you to use your body, and that can be a huge advantage. Finally, if you work indoors, you might be sitting down at a desk and typing all day long. After work, instead of relaxing, you'll probably have to go to the gym to work out.

Use these **revision marks** when you revise your sentences:

- To delete a word or punctuation mark, cross it out.
- To add a word or punctuation mark, insert a caret ( ^ ) in the line where you want it to go, and then write it in above the line.
- To change a word, cross it out and write the new word above it.
- To move a word or phrase, circle it and draw an arrow to its new position.
- To capitalize a letter, draw three lines under it.

---

## SENTENCE STRUCTURE ► PRACTICE 7.1

**A. Directions:** Read and revise the sentences. Correct these problems by using revision marks.

- ☑ fragments, run-ons, and comma splices
- ☑ incorrect coordination and subordination
- ☑ misplaced or dangling modifiers
- ☑ problems in parallel structure

**EXAMPLE:** It's fun to do a family tree, <sup>○</sup>you can learn a lot.

1. First, write down what you know about your family then interview relatives.
2. Videotaping or to record the interviews is a good idea.
3. Ask relatives to provide exact names, dates, and give other details.
4. Making copies of documents such as birth certificates and marriage licenses.
5. Interviewing older family members, they'll often tell you stories you never heard.
6. Record all the information you get and put it in a three-ring binder carefully.
7. Some people use their computers to do genealogy searches, they get very good results.
8. However, one must have the time, the patience, and know-how to use the Internet.
9. If you decide to learn more about your roots don't be surprised to find yourself at a huge family reunion.
10. The whole process of putting together a family tree and contacting long-lost family members.

**B. Directions:** Read the paragraphs below. Use revision marks to correct problems with sentences.

It was a beautiful day, the blue ocean sparkled in the sunlight. A perfect day for going to the beach. Looking across the sand, two little girls were building a sandcastle and made a moat next to it. Renelle spread out her towel she anchored it with her shoes and beach bag and began to read a magazine. Suddenly she heard a voice. "Are you going to get in the water, or are you just going to lie there?" Renelle looked up, and saw her friend Terry. She laughed softly and she got up and she greeted Terry. Putting on her sandals, the two of them walked across the burning sand to the water's edge.

Renelle loved going to the beach. Going to the beach relaxed her. Going to the beach helped her forget about her problems. It didn't cost money like most other forms of entertainment. Most of Renelle's friends also spent a lot of time at the beach so that was another incentive.

**Answers and explanations start on page 632.**

## Key Ideas

- Revise your essay if so that the organization is clear to the reader.
- Make sure that paragraph breaks fall in the right places.
- Check for faulty transitions and irrelevant details.

### GED TIP

*When you write the draft of your GED essay, leave wide margins and space between lines so that you can more easily use the revision marks and revise.*

## Revising Problems in Organization

When you reread your essay, you may also need to make changes in organization to make the essay clearer to the reader. As you read, ask yourself:

- Is my main idea clear?
- Are there a clear introduction, body of support, and conclusion?
- Is the paragraphing correct? Does each paragraph relate to only one main idea? Should any paragraphs be split into two? Should any be combined?
- Does each paragraph have a topic sentence that tells the main idea? Are any of the other sentences in a place that doesn't make sense? Are there any irrelevant details that should be removed?
- Does the writing flow smoothly from sentence to sentence and from paragraph to paragraph? If not, where can I add transitions?

Read the sample paragraph below. Think about how you would correct the errors in organization. Then compare it with the revised paragraph.

### Paragraph with problems in organization:

(1) Many people believe that changes in technology have improved our communication with others. (2) I believe that the opposite is true. (3) So-called technological improvements have led to a marked decline in the quality of interpersonal communication. (4) In the old days, when you called someone, the person was likely to pick up the phone to find out who was calling. (5) Nowadays, screening devices make that unnecessary. (6) By listening to your voice on the answering machine or by seeing your phone number pop up on his caller identification box, the other person can decide that he doesn't care to speak to you. (7) This encourages long games of "phone tag." (8) Television is another example—you can barely get a word out of someone who is glued to the tube.

### Paragraphs with revised organization:

(1) Many people believe that changes in technology have improved our communication with others. (2) However, I believe that the opposite is true. (3) So-called technological improvements have led to a marked decline in the quality of interpersonal communication.

(\*) Phone use is one area in which communication has suffered. (4) In the old days, when you called someone, the person was likely to pick up the phone to find out who was calling. (5) Nowadays, screening devices make that unnecessary. (6) By listening to your voice on the answering machine or by seeing your phone number pop up on his caller identification box, the other person can decide that he doesn't care to speak to you. (7) This encourages long games of "phone tag."

In the revised paragraphs, the transition *however* was added to sentence 2. The piece was divided into two paragraphs—an introductory paragraph and a body paragraph about phone use. A topic sentence (marked with \*) was added. Sentence 8 of the original, which was not related to telephones, was deleted.

Use these symbols to revise essay organization:

- To change whole sentences, use the same marks you used to change words.
- To start a new paragraph, use the paragraph symbol (¶).

---

## SENTENCE STRUCTURE ► PRACTICE 7.2

A. **Directions:** Using the revision marks, revise the paragraphs below.

**EXAMPLE:**

We've all heard countless advertising campaigns warning us not to litter. Yet some people still think nothing of throwing a soda can out of their car window onto the highway or dropping a candy wrapper on the sidewalk. Most of us realize that we are upsetting a delicate ecological balance when we don't dispose of our trash properly. Why do people continue to litter? Why do people continue to litter?

One reason people litter is that they just don't care about others. It doesn't bother them to leave their trash in front of someone else's apartment building, forcing another person to deal with the problem.

This inconsiderate attitude is also reflected in the refusal to recycle plastic, glass, and newspapers. People figure that they won't be around in the future when the landfills are used up, so who cares? Another possible reason for littering is low self-esteem. If people don't feel good about themselves, they won't be motivated to keep their environment looking attractive. Low self-esteem can cause many other problems, including depression and lack of self-confidence. People who have high self-esteem believe that it's important to keep their home, the planet Earth, clean and beautiful.

B. **Directions:** Revise the essay that you wrote on the following topic:

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Be sure to check for:

- clear main idea
- introduction, body, and conclusion
- correct paragraphing
- topic sentences
- logical placement of sentences
- irrelevant details that should be removed
- clear transitions

Save your work. You will use it in the next step of the writing process, editing.

**Answers and explanations start on page 632.**



# SENTENCE STRUCTURE PRACTICE QUESTIONS

Questions 1 through 5 refer to the following paragraphs.

## Conserving Household Energy

### (A)

(1) According to the Department of Energy, many families spend an average of 14 percent of their yearly income on heating and cooling costs. (2) Although you can't do much about high fuel prices, you can try some energy-saving measures.

### (B)

(3) To reduce wintertime energy costs, keep the shades drawn at night. (4) Seal your windows, so that cold air can't get through the cracks. (5) You can use sealing material available at any hardware store. (6) If you have an air conditioner, cover it with thick plastic. (7) Keep your thermostat at 68°F during the day. (8) Keep it at 62°F at night.

### (C)

(9) In the summer, use fans and natural breezes rather than air-conditioning whenever possible. (10) If you have windows that get direct sun. (11) Keep the shades down during the day. (12) Don't leave your air conditioner running when you're not at home, change the filter every summer. (13) With a clogged filter, the air conditioner's energy use can go up as much as 5 percent. (14) Put your air conditioner on a low setting. (15) Your home will not cool down when your air conditioner is on full blast any faster.

1. Sentence 4: **Seal your windows, so that cold air can't get through the cracks.**

Which correction should be made to sentence 4?

- (1) change seal to sealing
- (2) remove the comma
- (3) replace so that with because
- (4) change can't to couldn't
- (5) no correction is necessary

2. Sentences 7 and 8: **Keep your thermostat at 68°F during the day. Keep it at 62°F at night.**

The most effective combination of sentences 7 and 8 would include which group of words?

- (1) keeping your thermostat at
- (2) during the day, and to keep
- (3) during the day and 62°F
- (4) the day, keeping it at
- (5) at night, it should be kept

3. Sentences 10 and 11: **If you have windows that get direct sun. Keep the shades down during the day.**

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) sun. Keep
- (2) sun and to keep
- (3) sun keep
- (4) sun, keep
- (5) sun, keeping

4. Sentence 12: **Don't leave your air conditioner running when you're not at home, change the filter every summer.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) home, change
- (2) home change
- (3) home and change
- (4) home, so change
- (5) home. Do change

5. Sentence 15: **Your home will not cool down when your air conditioner is on full blast any faster.**

The most effective revision of sentence 15 would begin with which group of words?

- (1) Your home will not cool down any faster
- (2) Cooling down your home, when your air
- (3) Having the air conditioner on full blast, it
- (4) When your home will not cool down,
- (5) Air-conditioning your home on full blast,

---

Questions 6 through 10 refer to the following letter of complaint.

Cole Electronics  
2514 Broadway  
New York, NY 10057

Dear Manager:

**(A)**

(1) On August 2, I purchased a television at your store. (2) When I got the television home I discovered that the picture was fuzzy. (3) Returning to the store to see if the problem could be fixed easily. (4) I assumed that there would be no problem because I had just purchased the set.

**(B)**

(5) The customer service personnel said they had no time to handle my complaint. (6) They were extremely rude and unprofessional. (7) Finally, a salesman told me that I would have to send the TV to a service center in Detroit. (8) At that point, I demanded a refund. (9) Claiming that the TV had been used, it could not be returned.

**(C)**

(10) I am angry about the treatment I received and I am also very frustrated. (11) I would now like to receive a full refund or getting the TV repaired locally. (12) Please contact me to let me know what action will be taken. (13) My phone number is (212) 555-2719.

Sincerely,  
Jeffrey Barnes

6. Sentence 2: **When I got the television home I discovered that the picture was fuzzy.**

Which correction should be made to sentence 2?

- (1) replace When with Since
- (2) change got to gotten
- (3) insert a comma after home
- (4) insert a comma after discovered
- (5) change was to be

7. Sentence 3: **Returning to the store to see if the problem could be fixed easily.**

Which correction should be made to sentence 3?

- (1) replace Returning with I returned
- (2) add a comma after store
- (3) change to see to seeing
- (4) change could to can
- (5) no correction is necessary

8. Sentence 9: **Claiming that the TV had been used, it could not be returned.**

The most effective revision of sentence 9 would begin with which group of words?

- (1) He claimed that because
- (2) The TV was claimed to
- (3) Returning the TV,
- (4) Because of the used TV,
- (5) Making a claim about the TV

9. Sentence 10: **I am angry about the treatment I received and I am also very frustrated.**

The most effective revision of sentence 10 would include which group of words?

- (1) the treatment I received, and I
- (2) angry and frustrated about the
- (3) feeling angry about the treatment
- (4) being the recipient of such treatment
- (5) the manner in which I was treated

10. Sentence 11: **I would now like to receive a full refund or getting the TV repaired locally.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) refund or getting
- (2) refund, getting
- (3) refund, or getting
- (4) refund, or get
- (5) refund or get

---

Questions 11 through 15 refer to the following paragraphs.

### Workplace Friendships

#### (A)

(1) Should you make friends at work or keep your distance? (2) Most experts agree that it's not wise to get too chummy with your boss. Relationships with co-workers, however, are a more complex matter. (3) Although workplace friendships between peers can be beneficial, they can also cause problems.

#### (B)

(4) Workplace friendships have many positive aspects. (5) It's hard to work if you feel alone and in a productive way. (6) Having friends at work can make your day more pleasant, and give you energy. (7) Friends can serve as a sounding board for problems and help you succeed.

#### (C)

(8) However, like any other friendship, workplace friendships can turn sour. (9) Things get messy, when the friendship unravels in plain view of your boss and co-workers. (10) Discrimination and harassment suits have even been brought in some cases.

#### (D)

(11) Experts recommend keeping your social life with work friends out of the workplace. (12) For instance, don't exchange presents at work or talking about your evening out. (13) Avoid praising a friend publicly if it could make someone else resentful. (14) Keeping your work life separate from your social life may be hard but it's worth the effort.

11. Sentence 5: **It's hard to work if you feel alone and in a productive way.**

The most effective revision of sentence 5 would include which group of words?

- (1) work productively if you
- (2) to work, it isn't easy if
- (3) whether working productively or not
- (4) if you feel alone and productive
- (5) work, feel alone, and be productive

12. Sentence 6: **Having friends at work can make your day more pleasant, and give you energy.**

Which correction should be made to sentence 6?

- (1) change Having to Have
- (2) insert a comma after work
- (3) change make to making
- (4) remove the comma
- (5) change give to giving

13. Sentence 9: **Things get messy, when the friendship unravels in plain view of your boss and co-workers.**

Which correction should be made to sentence 9?

- (1) change get to are getting
- (2) remove the comma
- (3) change unravels to unravel
- (4) insert a comma after unravels
- (5) no correction is necessary

14. Sentence 12: **For instance, don't exchange presents at work or talking about your evening out.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) work or talking
- (2) work, or talking
- (3) work or talk
- (4) work, or talk
- (5) working, or talking

15. Sentence 14: **Keeping your work life separate from your social life may be hard but it's worth the effort.**

Which correction should be made to sentence 14?

- (1) change Keeping to Keep
- (2) insert it after social life
- (3) insert a comma after hard
- (4) insert a comma after but
- (5) replace it's with its

---

Questions 16 through 19 refer to the following paragraphs.

### Computer Virus Hoaxes

#### (A)

(1) If you use e-mail, you've probably received at least one message warning you of a terrible virus that will ruin your computer. (2) Most of these messages are hoaxes. (3) Designed to scare you. (4) Though some messages about viruses are accurate, most are just inaccurate rumors.

#### (B)

(5) Virus hoax messages are similar to one another. (6) Frequently, they describe viruses that will destroy your hard drive or computer. (7) These hoaxes also claim that a respected authority, such as a government agency, has issued a warning about the virus. (8) You can check a claim like this. (9) Contacting the agency is a good way to check. (10) Finally, hoaxes urge you to send the message to everyone you know, this just creates panic.

#### (C)

(11) If you receive a virus warning, don't pass it on. (12) However, you don't have to worry about opening the e-mail message itself. (13) Your computer can't get a virus that way. (14) Don't open any suspicious attachments, though, as you might infect your computer with a real virus. (15) By following these guidelines, you can keep your computer equipment safe, and avoid spreading hysteria.

16. Sentences 2 and 3: **Most of these messages are hoaxes. Designed to scare you.**

Which is the best way to write the underlined portion of these sentences? If the original is the best way, choose option (1).

- (1) hoaxes. Designed
- (2) hoaxes and they are designed
- (3) hoaxes, designing
- (4) hoaxes designed
- (5) hoaxes and designed

17. Sentences 8 and 9: **You can check a claim like this. Contacting the agency is a good way to check.**

The most effective combination of sentences 8 and 9 would include which group of words?

- (1) Checking a claim like this
- (2) To check a claim like this, contact
- (3) The agency in question can check
- (4) A good way to contact the agency
- (5) A good way to check, contacting

18. Sentence 10: **Finally, hoaxes urge you to send the message to everyone you know, this just creates panic.**

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) know, this
- (2) know and this
- (3) know this
- (4) know. This
- (5) know that this

19. Sentence 15: **By following these guidelines, you can keep your computer equipment safe, and avoid spreading hysteria.**

Which correction should be made to sentence 15?

- (1) change by following to to follow
- (2) replace these with this
- (3) remove the comma after guidelines
- (4) change can keep to are keeping
- (5) remove the comma after safe

**Answers and explanations start on page 632.**



---

## GRAMMAR AND USAGE ► PRACTICE 1.1

A. **Directions:** Write the correct pronoun to replace each underlined noun.

1. Laurie and Paul just moved to California. \_\_\_\_\_
2. A neighbor told Laurie and Paul that saving water was important there. \_\_\_\_\_
3. He said they should turn the water off when brushing their teeth. \_\_\_\_\_
4. Laurie's sister suggested getting a special shower head that saves water. \_\_\_\_\_
5. Laurie and Laurie's sister will go shopping for it on Sunday. \_\_\_\_\_

B. **Questions 6 through 8 refer to the following letter.**

To Whom It May Concern:

(A)

(1) I am writing to recommend Bonetta Williams for the position of managerial assistant in your firm. (2) I believe that she is highly qualified for the position, and I urge you to strongly consider her candidacy.

(B)

(3) Bonetta and me have worked together for three years. (4) As my secretary, she has proven to be responsible and efficient. (5) She always gets her work done on time and looks for ways to help others. (6) In addition, I find her extremely intelligent and likable. (7) I will be sorry to see her go.

(C)

(8) My supervisor, Walter Constantine, has also worked with Bonetta and would be happy to speak with you if necessary. (9) Please contact Walter or I if you need any further information.

Sincerely,

Carol Rhodes

7. **Sentence 5:** She always gets her work done on time and looks for ways to help others.

Which correction should be made to sentence 5?

- (1) replace She with Her
- (2) change her to hers
- (3) insert a comma after time
- (4) change looks to looking
- (5) no correction is necessary

8. **Sentence 9:** Please contact Walter or I if you need any further information.

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) Walter or I
- (2) Walter or me
- (3) he or I
- (4) him or I
- (5) he or me

Answers and explanations start on page 633.

6. **Sentence 3:** Bonetta and me have worked together for three years.

Which correction should be made to sentence 3?

- (1) replace me with I
- (2) replace Bonetta with She
- (3) insert a comma after me
- (4) change have to has
- (5) change have worked to been working



## Key Ideas

- A pronoun should match its antecedent in person and number.
- Make sure it is clear which antecedent a pronoun refers to.
- If necessary, use a noun in place of a pronoun, or construct the sentence differently so that the antecedent is clear.

### GED TIP

Take into account the whole passage when you are determining which pronoun is correct. For example, a paragraph may begin in the third-person one, then incorrectly shift to the second-person you.

## Pronoun-Antecedent Agreement

Pronouns should agree with their antecedents, or the nouns they refer to. For example, a pronoun and its antecedent must agree in number. If the antecedent is singular, the pronoun should be singular. If the antecedent is plural, the pronoun should be plural.

### EXAMPLES

Andy's company is very progressive. It pays for his college classes.  
singular antecedent                      singular pronoun

Many employees want to learn more skills, so they take classes.  
plural antecedent                                      plural pronoun

**Incorrect:** Any employee who is interested should submit their application.

**Correct:** Any employee who is interested should submit his or her application.

**Correct:** Employees who are interested should submit their applications.

Note that for collective nouns (such as *company, jury, family, team, committee, union*), you generally use the singular pronoun *it*.

**Incorrect:** The committee announced that they will hold weekly meetings.

**Correct:** The committee announced that it will hold weekly meetings.

A pronoun and its antecedent must agree in person. To agree, they both must be first person (referring to the speaker), second person (the person spoken to), or third person (the person or thing spoken about).

First person	Second person	Third person
I, me, my, mine	you, your, yours	he, him, his
we, us, our, ours		she, her, hers
		it, its
		they, them, their, theirs

The indefinite pronoun *one* is like a third-person personal pronoun. A common error in writing (and one that is tested on the GED Test) is an incorrect shift between the third-person *one* and the second-person *you*.

**Incorrect shift:** If one attends college classes, you can be reimbursed.

**Correct:** If one attends college classes, one can be reimbursed.

**Correct:** If one attends college classes, he or she can be reimbursed.

**Correct:** If you attend college classes, you can be reimbursed.

It must be clear which antecedent a pronoun refers to. If necessary, use a noun in place of the pronoun, or reconstruct the sentence.

**Unclear:** Carlos spoke to his boss, and he told him about the program.

**Clear (noun replaces pronoun):** Carlos spoke to his boss, and his boss told him about the program.

**Clear (different construction):** Carlos spoke to his boss, who told him about the program.

**Unclear:** Michelle helped Shania fill out the financial aid application that she had picked up.

**Correct (different construction):** After picking up a financial aid application for Shania, Michelle helped her fill it out.

## GRAMMAR AND USAGE ► PRACTICE 1.2

**A. Directions:** Correct any errors in pronoun use. If there are no errors, write C. You may also have to change some verbs.

they have

**EXAMPLE:** People who live in small towns know ~~one has~~ fewer amenities than big-city dwellers.

- \_\_\_ 1. Sally is moving to a small town. Her mother is concerned about the health care options they offer.
- \_\_\_ 2. Sally tried to reassure her mother, but it was hard for her to believe her.
- \_\_\_ 3. Sally asked a friend who lives in the town for information about its health care facilities.
- \_\_\_ 4. The town has a freestanding clinic where a person can go when they are sick.
- \_\_\_ 5. There is also a nearby hospital, and they have a very good reputation.
- \_\_\_ 6. If one is concerned about health care, you should sign up for a good insurance plan.

**B. Questions 7 through 9 refer to the following paragraphs.**

### The Best Discipline

(A)

(1) What should parents do when their children act up? (2) Parents often like the idea of punishment, but punishment may not be the most effective solution. (3) If the punishment results from the parent's anger, it won't work. (4) Instead, children will learn only that they shouldn't make one's parents angry.

(B)

(5) One parenting expert feels that they should be clear about their expectations from the outset so that children will not unknowingly violate rules. (6) They should respond to children's misbehavior in a calm and neutral fashion. (7) It's also important to choose a consequence related to the action. (8) If a child hits or bites in a play group, for example, it would be most appropriate not to allow the child to play with them for a short time. (9) He or she will begin to see the connection.

**7. Sentence 4:** Instead, children will learn only that they shouldn't make one's parents angry.

Which correction should be made to sentence 4?

- (1) remove the comma after Instead
- (2) change learn to have learned
- (3) replace they with you
- (4) change shouldn't to should'nt
- (5) replace one's with their

**8. Sentence 5:** One parenting expert feels that they should be clear about their expectations from the outset so that children will not unknowingly violate rules.

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) they
- (2) she
- (3) we
- (4) one
- (5) parents

**9. Sentence 8:** If a child hits or bites in a play group, for example, it would be most appropriate not to allow the child to play with them for a short time.

Which correction should be made to sentence 8?

- (1) insert a comma after hits
- (2) remove the comma after group
- (3) replace the child with them
- (4) replace them with the group
- (5) no correction is necessary

**Answers and explanations start on page 633.**

## Key Ideas

- Each verb has four forms: present, present participle, past, and past participle.
- Verb forms are used to create different tenses, which show time relationships.
- Use clues in the sentence and paragraph to help decide which tense to use.

### GED TIP

Some passages on the GED Test have a verb-tense question based on the tense of the entire passage. When you read a sentence in a question that sounds correct, make sure the tense matches the tense of the passage.

## GRAMMAR AND USAGE

### Verb Forms and Tenses

#### Regular Verbs

An important part of writing correctly is using the right verb forms. A **verb** is a word that indicates action or being. Each verb has a base form and four other forms. A **regular verb** follows a consistent pattern to create each verb form.

**Base form:** look

Tense	Verb Form	How to write it
Present	look/looks	with <i>I, you, we, they</i> : use the base form with <i>he, she, it</i> : add <i>-s</i> to the base form
Present participle	looking	add <i>-ing</i>
Past	looked	add <i>-ed</i> ( <i>-d</i> if verb ends with <i>e</i> )
Past participle	looked	add <i>-ed</i> ( <i>-d</i> if verb ends with <i>e</i> )

The forms are used to create different **verb tenses**, or times. The table below shows how verb tense and form are related. Notice that when you use certain tenses, you must also use a **helping verb**—often a form of *be* or *have*.

Tense	Verb Form	Use
<b>Present</b>	look/looks	a habitual action, general truth, or state of being: <i>I look at the newspaper every day.</i>
<b>Past</b>	looked	an action that has been completed: <i>I looked at it this morning.</i>
<b>Future</b>	will look	an action that has not yet happened: <i>I will look at it tonight, too.</i>
<b>Present progressive</b>	am/is/are looking	an action in progress: <i>I am looking at it right now.</i>
<b>Present perfect</b>	have/has looked:	an action that began in the past and continues until now: <i>I have looked at it every day this week.</i>
<b>Past perfect</b>	had looked	an action that was completed before a specific time in the past: <i>I had looked at it before it got wet.</i>
<b>Future perfect</b>	will have looked	an action that will be completed by a specific time in the future: <i>I will have looked at it by the time I get home.</i>

Sentences often contain clues that tell you which tense to use. For instance, time words and phrases like *yesterday* or *last week* show that the past should be used, *tonight* and *next month* indicate the future, and *by tonight*, *since 2000*, and *for seven years* indicate the perfect tenses.

Other verbs in the sentence can be clues: *I look at the newspaper whenever I get the chance.* Finally, verbs in other sentences also can be clues. The verbs in a paragraph or passage are generally in the same tense.

## GRAMMAR AND USAGE ► PRACTICE 2.1

**A. Directions:** Rewrite each verb in its correct tense. Use clues in each sentence for help in choosing the tense.

**EXAMPLE:** Between 1892 and 1924, about 12 million immigrants entered (enter) the U.S. through Ellis Island in New York.

1. By the 1950s, Ellis Island \_\_\_\_\_ (cease) to be an important immigration checkpoint.
2. The government \_\_\_\_\_ (close) Ellis Island to immigration in 1954.
3. Now Ellis Island \_\_\_\_\_ (function) as a national monument.
4. Since the island was reopened as a museum in 1990, many tourists \_\_\_\_\_ (visit) it.
5. Soon, a genealogical center \_\_\_\_\_ (open).
6. The island \_\_\_\_\_ (look) different than it did originally because 24 acres of land-fill have been added.
7. Now we \_\_\_\_\_ (think) about taking a trip to Ellis Island next month.

**B. Questions 8 through 10 refer to the following advertisement.**

### Don't Miss Your Chance!

#### (A)

(1) The Express Lane credit card has offered a fantastic deal right now, for a limited time only. (2) If you sign up for Express Lane before April 9, you will receive a 20 percent discount on your first five purchases!

#### (B)

(3) The Express Lane card carries no monthly charge. (4) You'll pay a low \$35 fee just once a year. (5) Become an Express Lane member now. (6) Your savings opportunities will be amazing you!

**8. Sentence 1:** The Express Lane credit card has offered a fantastic deal right now, for a limited time only.

Which is the best way to write the underlined portion of the sentence? If the original is the best way, choose option (1).

- (1) has offered
- (2) is offering
- (3) offered
- (4) offers
- (5) will offer

**9. Sentence 2:** If you sign up for Express Lane before April 9, you will receive a 20 percent discount on your first five purchases!

Which correction should be made to sentence 2?

- (1) change sign to have signed
- (2) remove the comma after April 9
- (3) change you will to one will
- (4) change will receive to receive
- (5) no correction is necessary

**10. Sentence 6:** Your savings opportunities will be amazing you!

Which correction should be made to sentence 6?

- (1) change Your to You're
- (2) change Your to One's
- (3) insert a comma after opportunities
- (4) change will have amazed to amazed
- (5) change will be amazing to will amaze

**Answers and explanations start on page 633.**

## Key Ideas

- Irregular verb forms do not follow a single pattern.
- Some irregular verbs follow an *i, a, u* pattern.

## Irregular Verbs

Most verbs are regular verbs; their past and participle forms follow the same pattern. Some verbs, however, are **irregular verbs**. Although some irregular verbs follow a pattern, most do not.

A common error with irregular verbs is using the past participle in place of the past—for instance, *I been there* instead of *I was there*. Discover which irregular verb forms, if any, give you problems. Then learn the correct forms. Here are some tips for learning the forms of irregular verbs:

- If you find two verbs that rhyme in the present form (for example, *grow* and *throw*), check to see if they have the same forms in the past and past participles (*grew, grown; threw, thrown*). If so, learn them together.
- Learn which verbs follow the *i, a, u* pattern: *sing, sang, sung; drink, drank, drunk; sink, sank, sunk*. However, be aware that there are exceptions (*bring, brought, brought*).

Here is a list of common irregular verbs.

Present Form	Past Form	Past Participle Form
am, are, is	was, were	been
become	became	become
begin	began	begun
blow	blew	blown
break	broke	broken
bring	brought	brought
buy	bought	bought
choose	chose	chosen
come	came	come
do	did	done
drink	drank	drunk
eat	ate	eaten
fall	fell	fallen
fly	flew	flown
freeze	froze	frozen
get	got	gotten
give	gave	given
go	went	gone
grow	grew	grown
have, has	had	had
know	knew	known
leave	left	left
lose	lost	lost
ride	rode	ridden
run	ran	run
see	saw	seen
shake	shook	shaken
show	showed	shown
speak	spoke	spoken
steal	stole	stolen
take	took	taken
throw	threw	thrown
wear	wore	worn
write	wrote	written

### GED TIP

When you choose an answer that changes a verb, read the sentence again, with your choice in it. Doing so may help you “hear” whether the verb form is correct.

---

## GRAMMAR AND USAGE ► PRACTICE 2.2

A. **Directions:** Write the correct form of the verb shown in parentheses.

**EXAMPLE:** Since November, the school's heating system has broken (break) down several times.

1. Yesterday the technician \_\_\_\_\_ (come) to resolve the problem once and for all.
2. School employees \_\_\_\_\_ (show) him the boiler.
3. The technician said, "If you \_\_\_\_\_ (speak) to me about this sooner, it would have been easier to fix."
4. He \_\_\_\_\_ (take) parts out of the heating system and replaced them with new ones.
5. He said, "I've never \_\_\_\_\_ (see) such a poorly installed system."

B. **Questions 6 through 8 refer to the following paragraphs.**

### TV Rating Systems

#### (A)

(1) In 1996, television industry representatives announced that the industry had formed TV Parental Guidelines. (2) This rating system, designed to give parents advance warning about the content of TV shows, begun to appear on TV in 1997. (3) The ratings system was broke down into six different categories, ranging from "All Children" to "Mature Audiences Only."

#### (B)

(4) Six months later, after pressure from advocacy groups, the television industry agreed to include additional labels to advise viewers if a show they were about to view contained violence, sexual activity, coarse language, or sexually suggestive language. (5) These labels now given viewers more specific and therefore more helpful information about an upcoming show.

6. **Sentence 2:** This rating system, designed to give parents advance warning about the content of TV shows, begun to appear on TV in 1997.

Which correction should be made to sentence 2?

- (1) remove the comma after system
- (2) change give to be giving
- (3) remove the comma after shows
- (4) change begun to had begun
- (5) change begun to began

7. **Sentence 3:** The ratings system was broke down into six different categories, ranging from "All Children" to "Mature Audiences Only."

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) was broke
- (2) broke
- (3) was broken
- (4) breaking
- (5) had broken

8. **Sentence 5:** These labels now given viewers more specific and therefore more helpful information about an upcoming show.

Which correction should be made to sentence 5?

- (1) change given to will give
- (2) change given to give
- (3) insert a comma after specific
- (4) insert a comma after information
- (5) no correction is necessary

**Answers and explanations start on page 634.**



## GRAMMAR AND USAGE

## Subject-Verb Agreement

**Key Ideas**

- A verb must match its subject in number.
- Collective nouns are singular when they refer to a group as a single unit.
- Indefinite pronouns may be singular, plural, or both.

**GED TIP**

If a verb in a GED item is underlined, ask yourself three questions: Does the verb agree with its subject? Is the verb in the right form? Is the verb in the right tense for both the sentence and the passage?

**Agreement with a Simple Subject**

In the present tense, subjects and verbs must agree in number. To understand the basics of subject-verb agreement, study the chart below. Notice that present tense verbs take an -s ending when they are used with the pronoun subjects *he*, *she*, and *it* or their noun equivalents.

Verb Forms for Singular Subjects	Verb Forms for Plural Subjects
<i>I</i> jump	<i>we</i> jump
<i>you</i> jump	<i>you</i> jump
<i>he, she, it</i> jumps	<i>they</i> jump

To master subject-verb agreement for the GED Test, be aware of these special nouns and pronouns:

**Collective nouns** are usually singular, even though they may seem plural. A collective noun names a group, such as *army*, *crew*, *crowd*, *staff*, *family*, *herd*, or *flock*. If the group is considered to be a single unit, it is singular.

**EXAMPLES**

The army is a good place to learn discipline.

The church choir sings each Sunday.

Some nouns that end in -s may look plural, but in fact they are not.

**EXAMPLE**

Politics is an interesting topic.

**Indefinite pronouns** do not refer to a specific person. Some indefinite pronouns are singular, some are plural, and some may be either.

Singular	anyone, everyone, someone, no one, one anybody, everybody, somebody, nobody anything, everything, something, nothing another, other either, neither, each, much
Plural	many, several, few, both
Singular or plural	all, none, some, any, part, most

**EXAMPLES**

**Singular:** These days, it seems as if almost everyone is joining a health club.

**Singular:** Most of the equipment is easy to use.

**Plural:** Most of the exercise classes are fun

**Plural:** A few are advanced classes for those already in great shape.

---

## GRAMMAR AND USAGE ► PRACTICE 3.1

A. **Directions:** Underline the correct verb form to complete each sentence.

**EXAMPLE:** Every Monday, the National Orchestra (perform, performs) live on the radio.

1. The public (is, are) invited to listen free of charge.
2. Free tickets (becomes, become) available one hour before the performance.
3. The performance (is, are) usually held in Barnes Hall.
4. Many well-known musicians (has, have) played there.
5. Everyone (seem, seems) to enjoy these concerts very much.
6. The concert series (is, are) very popular.

B. Questions 7 through 9 refer to the following article.

### The Speed of Sound

#### (A)

(1) Most of us has heard airplane noise that is so loud it sounds like an explosion. (2) That noise occurs when a plane start to fly faster than the speed of sound. (3) Listeners on the ground hear the noise, but it is not audible to passengers.

#### (B)

(4) The speed of sound is 1,088 feet per second at 32°F at sea level. (5) It is different at other temperatures and in other substances. (6) For example, sound travels faster in water than in air. (7) Sound takes about one second to move a mile under water, but five seconds to move a mile through air. (8) It travels through ice cold vapor at 4,708 feet per second and through ice cold water at 4,938 feet per second. (9) Surprisingly, some other materials conducts sound very well. (10) For instance, sound travels through glass at speeds up to 19,690 feet per second.

7. **Sentence 1:** Most of us has heard airplane noise that is so loud it sounds like an explosion.

Which is the best way to write the underlined portion of this sentence? If the original is the best way, choose option (1).

- (1) has heard
- (2) have heard
- (3) has been hearing
- (4) having heard
- (5) hears

8. **Sentence 2:** That noise occurs when a plane start to fly faster than the speed of sound.

Which correction should be made to sentence 2?

- (1) change occurs to occur
- (2) change occurs to occurred
- (3) replace plane with plain
- (4) change start to starts
- (5) replace than with then

9. **Sentence 9:** Surprisingly, some other materials conducts sound very well.

Which correction should be made to sentence 9?

- (1) remove the comma
- (2) replace some with any
- (3) change conducts to conduct
- (4) change conducts to conducted
- (5) no correction is necessary

Answers and explanations start on page 634.

## Key Ideas

- If a compound subject is joined by *and*, use a plural verb.
- If a compound subject is joined by *or*, *either . . . or*, or *neither . . . nor*, the verb should agree with the subject closer to it.
- When checking subject-verb agreement, ignore interrupting phrases, and watch for inverted structure.

### GED TIP

Read there's as there is and here's as here is to "hear" whether the subject and verb agree.

## Agreement with a Compound Subject

A compound subject is made up of two or more subjects joined by *and* or *or*. To make a verb agree with a compound subject, follow these guidelines:

When two or more subjects are joined by *and*, the compound subject is plural. Use the correct verb form for the plural.

**EXAMPLE:** Tricia and her sister are caring for their mother.

If two subjects are joined by *or*, the verb agrees with the subject closer to it:

**EXAMPLE:** A health aide or a nurse visits each day.

When subjects are joined by *either . . . or* or *neither . . . nor*, the verb agrees with the subject closer to it.

**EXAMPLE:** Neither the sisters nor their brother has medical training.

## Interrupting Words

Sometimes a word or group of words comes between the subject and the verb. In that case, locate the subject by asking yourself, What is this sentence really about? Mentally cross out the interruptor. Then make the verb agree with the subject.

**EXAMPLE:** The medicine ~~prescribed by the doctors~~ is on a high shelf.  
subject interruptor verb

Interrupting phrases often begin with prepositions, such as *of*, *in*, *on*, *from*, *with*, *to* and *for*.

**EXAMPLE:** A pile of medical supplies rests in the front hallway.

Interrupting phrases may be set off by commas. Watch especially for phrases beginning with words like *along with*, *as well as*, *besides*, and *in addition to*.

### EXAMPLES

Dr. Silva, ~~who is one of the surgeons~~, consults with the family.

The sisters, ~~along with the medical team~~, keep the patient comfortable.

## Inverted Structure

Checking subject-verb agreement can be tricky when the sentence structure is **inverted**—that is, when the subject comes after the verb. Most questions and sentences that begin with *here* or *there* are inverted.

### EXAMPLES

Does the pharmacy have enough medicine to fill the prescription?

Here are the hospital supplies that Tricia ordered.

**Incorrect:** What is Tricia and her family going to do?

**Correct:** What are Tricia and her family going to do?

**Incorrect:** Do Tricia want to send her mother to a hospital?

**Correct:** Does Tricia want to send her mother to a hospital?

**Incorrect:** There's the bandages. (Remember that *There's* is short for *There is*.)

**Correct:** There are the bandages.

---

## GRAMMAR AND USAGE ► PRACTICE 3.2

**A. Directions:** If a sentence contains an interrupting phrase, cross out the interruptor. Then underline the correct verb to complete the sentence.

**EXAMPLE:** Brushing and flossing ~~with regularity~~ (is, are) key to good dental health.

1. Many toothpastes on the market (carry, carries) a seal of approval from the American Dental Association.
2. Products carrying the seal (are, is) tested to guarantee that they are safe and effective.
3. Fluoride, an important ingredient in many toothpastes, (strengthens, strengthen) teeth and (attacks, attack) bacteria that cause tooth decay.
4. There (is, are) toothpastes that claim to have special benefits, like tartar control or whitening.
5. A few pharmacies and supermarkets (offers, offer) store-brand toothpaste at a low price.
6. Any toothpaste with fluoride and good flavor (is, are) fine to use, even if it's not a brand-name toothpaste.

**B. Questions 7 through 9 refer to the following paragraphs.**

### Unemployment Insurance

(A)

(1) Unemployment insurance provides workers who have lost their jobs with partial replacement of their salary. (2) Each state administers its own program and have its own laws. (3) The amount received is determined by wage level and the length of employment. (4) When the unemployment rate rises above a certain level, states are required to extend the benefits. (5) The state and federal governments share the cost of the additional benefits.

(B)

(6) In most states, employer contributions pay for this program. (7) Unemployed workers who wish to draw benefits reports regularly to their public employment office to learn about job openings.

**7. Sentence 2:** Each state administers its own program and have its own laws.

Which correction should be made to sentence 2?

- (1) change state to State
- (2) change administers to administering
- (3) change administers to administer
- (4) change have to has
- (5) replace its with it's

**8. Sentence 3:** The amount received is determined by wage level and the length of employment.

If you rewrote sentence 3 beginning with Wage level and the length of employment the next word(s) should be

- (1) determine
- (2) determines
- (3) is determined
- (4) has determined
- (5) was determined

**9. Sentence 7:** Unemployed workers who wish to draw benefits reports regularly to their public employment office to learn about job openings.

Which correction should be made to sentence 7?

- (1) insert a comma after workers
- (2) change wish to wishes
- (3) insert a comma after benefits
- (4) change reports to report
- (5) replace their with there

**Answers and explanations start on page 634.**

## GRAMMAR AND USAGE

## Essay Writing Skills: Editing

**Key Ideas**

- Use precise words instead of vague ones.
- Express your ideas in as few words as possible.
- When writing an essay, use formal language instead of slang.

**GED TIP**

*To edit the draft of your essay, use the same marks you used to revise it. Then if you copy your essay over, incorporate the revising and editing changes you made. This version will be the one read by the GED scorers.*

After you have written and revised your essay, you will need to edit it. In the editing stage of the writing process, you check for correct grammar, usage, and word choice. You may already have made some organizational changes. The kinds of changes you make when you are editing will be smaller—more like fine-tuning.

You know a lot about grammar and usage from working through the first three lessons in this section. What about word choice? There are several aspects of word choice to look at when you are editing: using precise words, avoiding wordiness, and avoiding slang.

People often use vague terms when they are speaking. They say things like, “It was a great party!” or “The weather is nice today.” General words like great and nice are okay in conversation because the listener can ask questions such as, “What was so great about the party?” In writing, however, you should try to write specific words that create a clear picture for the reader.

**With vague words:** Tim took a long hike in the beautiful mountains.

**With precise words:** Tim took a 12-mile hike in the rocky, snowy mountains.

**With vague words:** He walked through a forest where the ground was covered with pine needles.

**With precise words:** He meandered through a forest where the ground was carpeted with pine needles.

It’s also helpful to your reader if you write concisely and avoid wordiness. Being brief helps the reader focus on your message. If you notice that you have said the same thing twice, cut out the extra words.

**Too wordy:** Tim’s dream and the thing he hopes for most of all is to make a home for himself and live in a cabin in the woods.

**More concise:** Tim’s most cherished dream is to live in a cabin in the woods.

**Too wordy:** The only thing getting in the way of his having this dream come true is that his wife isn’t so sure that it’s such a fantastic idea.

**More concise:** The only obstacle to realizing his dream is his wife’s resistance.

Finally, avoid using slang when writing your essay. Though people sometimes use informal language when speaking, essay writing calls for more formal language. Take care to express yourself appropriately.

**With slang:** Tim is going to hit the road at seven tonight.

**With more formal language:** Tim is going to leave town at seven tonight.

**With slang:** He needs a better map because he’s totally clueless about directions.

**With more formal language:** He needs a better map because he has difficulty understanding directions.

---

## GRAMMAR AND USAGE ► PRACTICE 4

**A. Directions:** Replace each of the underlined words or phrases with more appropriate language. Write your answers on a separate sheet of paper.

1. Families International is a non-profit organization that does not make any money.
2. We give aid to many children in the Third World every year.
3. These children must endure lousy living conditions.
4. Your donation, even if it is only five bucks, will help a child get food and clothing.
5. Please send your donation as soon and as quickly as possible to the following address.

**B. Directions:** Edit the paragraphs below for correct grammar and usage, paying special attention to nouns and pronouns, subject-verb agreement, and regular and irregular verbs.

If you ever order merchandise from a catalog, you should be aware of your rights. All companies, regardless of what state they are located in, is required to ship your order within 30 days unless they have advertise a different shipping time. If a company is unable to meet the shipping deadline, they must send you an “Option Notice.” You can choose to wait longer or get a refund.

Some consumers complaining about receiving merchandise that they did not order. They were told that companies that engaged in this practice broken the law. If they send you a product you haven’t order, it is yours to keep.

If you receive a package that been damaged, don’t open it. Write “REFUSED” on the package, and return it to the seller. There’s no need to add new postage as long as the package come by regular mail.

**C. Directions:** Edit the essay that you wrote on the following topic:

**TOPIC**

What are the advantages and disadvantages of owning a pet?

In your essay, explain the advantages, the disadvantages, or both. Give reasons to support your answer.

Be sure to check for:

- Correct use of nouns and pronouns
- Correct use of regular and irregular verbs
- Subject-verb agreement
- Word choice

**Answers and explanations start on page 634.**



## Key Ideas

- Be aware of who your readers are and why you are writing.
- Don't use slang or nonstandard English in your essay.
- The evaluators will judge your essay on its overall effectiveness.

## ON THE GED

*The evaluators do not judge whether your opinion is right or wrong. Rather, they look to see that you support your opinion well with reasons and examples.*

# THE GED ESSAY

## Approaching the Essay Topic

### Knowing Your Audience and Purpose

Whenever you write something that someone else will read, you need to think about your **audience**—who will be reading your work—and your **purpose**—why you are writing.

The audience of your GED essay is the pair of evaluators who will score the essay. Because you don't know them or their background, you need to:

- Use formal language rather than slang.
- Use Standard American English, even if you speak another variant of English.
- Be clear and specific. Explain carefully, include details and background information, and give examples to get your point across.

The essay evaluators are trained to score your essay holistically—on the basis of its overall effectiveness. They will read the essay once, fairly quickly, to get an impression of your work as a whole. The essay readers will be asking themselves the following questions about your paper:

- Is there a clearly focused main idea?
- Is the main idea of the essay about the topic?
- Is the essay clearly and logically organized?
- Is the word choice appropriate and effective?
- Does the essay have correct sentence structure, grammar, and mechanics?

Each reader will assign your essay a score from 1 to 4. The average of the two scores is combined, through a formula, with your score from Part I of the test. Your essay score will reflect one of the general categories shown below:

- |                           |                            |
|---------------------------|----------------------------|
| <b>Level 4</b> —effective | <b>Level 2</b> —marginal   |
| <b>Level 3</b> —adequate  | <b>Level 1</b> —inadequate |

You can review the standards for these categories on page 65, “**The Standards for Your Essay Score.**”

The purpose of your GED essay will be to give an explanation about a specific situation. To accomplish this purpose, you may need to:

- State and explain your opinion.
- Discuss the causes or effects of a phenomenon.
- Compare or contrast two things.
- List reasons for something.
- List the qualities of something.

The essay topic assignment requires you to know only the types of information, facts, and examples that you would be likely to know from your own experience.

## Reading the Directions

Before you begin writing, read the directions carefully. The complete directions for the GED Essay are printed on page 158. Below are excerpts of the directions.

### Essay Directions

Look at the box on the next page. In the box are your assigned topic and the letter of the topic.

You must write on the assigned topic **ONLY**.

You will have 45 minutes to write on your assigned essay topic. You may return to the multiple-choice section after you complete your essay if you have time remaining in this test period. Do not return the Language Arts, Writing Test booklet until you finish both Parts I and II of the Language Arts, Writing Test.

**REMEMBER, YOU MUST COMPLETE BOTH THE MULTIPLE-CHOICE QUESTIONS (PART I) AND THE ESSAY (PART II) TO RECEIVE A SCORE ON THE LANGUAGE ARTS, WRITING TEST.**

To avoid having to repeat both parts of the test, be sure to do the following:

- Do not leave the pages blank.
- Write legibly in ink so that the evaluators will be able to read your writing.
- Write on the assigned topic. If you write on a topic other than the one assigned, you will not receive a score for the Language Arts, Writing Test.
- Write your essay on the lined pages of the separate answer sheet booklet. Only the writing on these pages will be scored.

Part II is a test to determine how well you can use written language to explain your ideas. In preparing your essay, you should take the following steps:

- Read the DIRECTIONS and the TOPIC carefully.
- Plan your essay before you write. Use the scratch paper provided to make any notes. These notes will be collected but not scored.
- Before you turn in your essay, reread what you have written and make any changes that will improve your essay.

Your essay should be long enough to develop the topic adequately and should be approximately 250 words.

Reprinted with permission of the GED Testing Service of the American Council on Education.

Notice that the directions tell you to plan, write, reread, and improve your essay. These steps make up the writing process. As you work on your essay, be aware of how much time you need for each step. Plan in advance to allot a certain number of minutes for each step, and stick to your plan. For instance, you may use the following plan:

- Prewriting and Organizing: 10 minutes
- Drafting: 25 minutes
- Revising and Editing: 10 minutes

You may need more time for one step and less for another, so analyze your habits and learn what's best for you. Time management is discussed in greater detail on page 156.

## Key Ideas

- Read the topic carefully.
- Look for a key phrase that may tell you how to approach the topic.
- Answer the GED essay question on the basis of your life experience, knowledge, and personal observations.

## ON THE GED

*The topic for the GED essay has been chosen specifically for its interest and meaningfulness to both the writer (you) and the readers (the holistic scorers).*

## Approaching the Topic

After you read the directions, your next step will be to reread the topic assignment that appears in the box. The topic assignment may include a brief introductory statement. The topic itself often is presented in the form of a question. It is important to answer that question directly. If your essay answers a different question from the one that is asked, it will not be scored.

Here's a sample topic:

TOPIC
What accounts for the popularity of “real life” TV shows, in which real people are placed in a situation so that viewers can see how they act? In an essay, explain why these shows are so popular. Support your view with reasons and examples.

GED essay topics do not require any specialized knowledge or background information. You will not be asked to provide any specific dates, statistics, or researched factual information. Instead, like the topic shown above, GED topics are meant to be answered on the basis of life experience. Most topics ask you to explain something or to give your point of view.

The topic assignment often includes a “clue phrase” to help you decide which kind of information to include in the essay. Here are some examples:

Clue Phrases:	Information to put in your essay:
Tell how . . . Explain how . . . Identify . . .	Facts or reasons to explain an issue
Present your opinion . . . Explain your answer . . . State your point of view . . .	Your opinion and the reasons for it
State the reasons for . . . Explain why . . . Discuss the effect of . . . How does this affect . . .	Reasons; causes and/or effects
Discuss the similarities and differences . . .	A comparison of two things or a contrast

Now read the sample topic again. What kind of information would you put in an essay on this topic?

TOPIC
What accounts for the popularity of “real life” TV shows, in which real people are placed in a situation so that viewers can see how they act? In an essay, explain why these shows are so popular. Support your view with reasons and examples.

The essay should include reasons, as indicated by the phrase *explain why*. . . .

Read the next sample topic. What kind of information should you include?

**TOPIC**

How do you differ from other members of your family, and how are you similar?  
In your essay, discuss the similarities and differences. Give specific examples.

The statement *discuss the similarities and differences* indicates that the essay should compare and contrast two things.

Read the next sample topic. What kind of information should you include?

**TOPIC**

Do you believe it is worthwhile to save for retirement?  
State your point of view in an essay. Use your personal observations, experience, and knowledge to support your view.

The directions *state your point of view* indicate that you should give an opinion.

---

## THE GED ESSAY ► PRACTICE 1

**Directions:** Read each topic. Then list the kind of information you should include.

**TOPIC A**

Many people have hobbies like stamp collecting or knitting. Why do people enjoy hobbies?  
Write an essay explaining why people enjoy hobbies. Supply reasons and examples to support your view.

Include what kind of information? \_\_\_\_\_

**TOPIC B**

What advice would you give to someone who has trouble controlling his or her anger?  
In an essay, suggest ideas for anger management. Tell how they would be helpful. Use your personal observations, experience, and knowledge.

Include what kind of information? \_\_\_\_\_

**TOPIC C**

In your opinion, are “No Smoking” sections in restaurants a service to the public, or are they simply a nuisance to smokers?  
Present your opinion on the topic. Give reasons and examples to support your view.

Include what kind of information? \_\_\_\_\_

**Answers and explanations start on page 636.**

## THE GED ESSAY

## Prewriting Your Essay

**Key Ideas**

- Generate ideas by listing or brainstorming. Try to finish in about five minutes.
- After you have generated ideas, look them over and decide on your main idea. Then cross out ideas that don't support your main idea.

**GED TIP**

*Brainstorming is always a timed activity. Listing ideas—for a letter, memo, school essay—usually is not. However, because the GED essay is timed, you must also set a time limit if you use this method.*

**Generating Ideas**

After you have identified the topic of your essay, you must think of ideas. In Unit 2, you read about two methods of coming up with ideas: listing and brainstorming. When you **list** ideas, you think carefully about the topic and list ideas to include in your essay. Try to stay on topic as much as possible. Create a list of useful ideas that needs little editing.

When you **brainstorm** ideas, you think about the topic and write down everything that comes to mind. Include all ideas, even if they appear to be off-topic. Let your mind go and write as quickly as possible. Create a long list of ideas that you will carefully edit before you move on.

You may find that in a timed essay test such as the GED Writing Test, it is better to generate ideas by listing rather than by brainstorming. If you carefully list ideas, you won't have to spend as much time evaluating them and eliminating irrelevant ones. However, if you have trouble coming up with ideas, brainstorming may be the better method for you.

Read the essay topic below, and look at the ideas generated for it. Note the ideas deleted from the brainstormed list. They do not directly support the main idea.

**TOPIC**

Is it better to be single or married? Support your opinion in an essay.

**Idea List**

More freedom when single  
Spend money however you want  
~~Stay out late~~  
Support only yourself  
Not responsible for another  
Try out new things

Different kinds of relationships  
Have own schedule  
Make own decisions  
Don't have to do another's laundry  
More self-reliant

**Brainstormed List**

More freedom when you're single  
Being single—self-reliant  
~~Everyone needs soulmate~~  
Partner can be best friend  
~~Can be lonely either way~~  
~~My friends got a divorce~~  
Marriage ties you down  
Single people choose own friends

Two incomes better than one  
No money hassles with someone else  
~~High cost of weddings~~  
Don't have to do someone else's chores  
No legal involvement  
Married couples lose feeling for each other  
~~Kids have two parents at home~~

Review your list to find your main idea. Determine the main point that most of your ideas seem to lead to, and cross out the irrelevant ideas. Here is the main idea of both groups of ideas shown above:

**Main Idea:** The single life is better.

---

## THE GED ESSAY ► PRACTICE 2.1

**A. Directions:** Read each topic and generate ideas as instructed.

**TOPIC**

Many people have hobbies like gardening or knitting. Why do people enjoy hobbies?  
Write an essay explaining why people enjoy hobbies. Supply reasons and examples to support your view.

- 1a. List ideas. Find your main idea, and cross out irrelevant ones. Time yourself.  
b. It took me \_\_\_\_\_ minutes to list ideas.

**TOPIC**

Would you recommend your town as a place for tourists to visit? Why or why not?  
Present your opinion in an essay. Support it with observations and experiences.

- 2a. Brainstorm ideas. Find your main idea, and cross out irrelevant ones. Give yourself five minutes.  
b. Five minutes was  too long  too short  just right

**TOPIC**

What are the benefits of daily exercise?  
In your essay, describe its positive effects. Supply reasons and examples.

- 3a. Brainstorm or list ideas. Give yourself six minutes.  
b. Six minutes was  too long  too short  just right

**B. Directions:** Brainstorm or list ideas for the topic below. Give yourself the amount of time you think is best. Save your work. You will use these ideas in the next lesson.

**TOPIC**

In your opinion, are “No Smoking” sections in restaurants a service to the public, or are they simply a nuisance to smokers?  
Present your opinion on the topic. Give reasons and examples to support your view.

**C. Directions:** After you have finished the exercises above, complete this strategy box. If you need more practice, review Unit 2, Lesson 4, “Essay Writing Process: Prewriting.”

**MY TEST-TAKING STRATEGY**

My favorite technique for generating ideas is \_\_\_\_\_.  
I need about \_\_\_\_\_ minutes for generating ideas.

**Answers and explanations start on page 636.**



## Key Ideas

- Effectively grouping your ideas will give you a solid plan to follow as you write your essay.
- Idea maps and outlines are two methods of grouping ideas.
- Be sure to give yourself the time you need to create a well-planned map or outline.

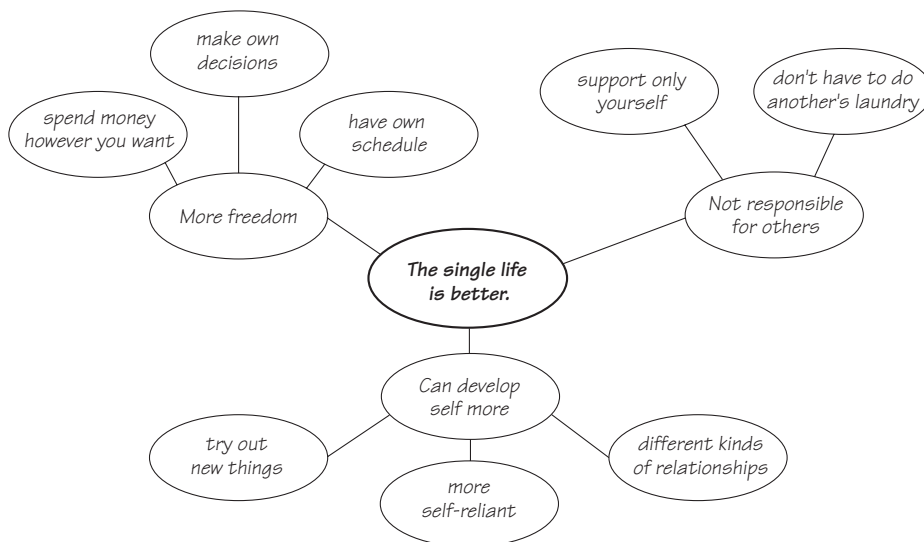
### GED TIP

*Generating and organizing are not an exact science. New ideas may occur to you as you make an idea map or an outline. If the new ideas support your main idea, add them.*

## Grouping Ideas

After you've generated a list and determined your main idea, you need to group similar ideas together and label each group. Each group will become a paragraph in your essay. Earlier in this book, you read about two methods of grouping: mapping and outlining. You will need to decide which method is better for you.

To make an **idea map**, write your main idea in the center of a sheet of paper, and circle the idea. Try to separate your ideas into three main groups and label them. Add these labels to the map, circle them, and attach them to the main idea as shown below. Then add related ideas to each group.



When you make an **outline**, you also put your ideas into groups and label each group. Organize your groups and the ideas within them in an indented list. You may number your groups as shown below, using roman numerals (I, II, III), capital letters, and numbers, or you may devise your own system of numbering.

### I. No responsibilities

- A. Support only yourself
- B. Don't have to do someone else's laundry

### II. More freedom

- A. Make own decisions
- B. Don't have to adjust to someone else's schedule
  1. Stay out late
  2. No arguments
- C. Do what you want

### III. Can develop self more

- A. Try out new things
- B. Have different kinds of relationships

## THE GED ESSAY ► PRACTICE 2.2

- A. **Directions:** Read the topic and the ideas listed below. Then complete the exercise that follows.

### TOPIC

What are the causes of stress? In an essay, explain why people experience stress.

working too hard	big changes like moving to a new home
noisy environment	taking a test
waiting for results of medical test	lots of people bothering you
trying to meet tight deadline	being responsible for something important
money troubles	something going wrong, like car breaking down

1. Summarize the ideas in a main idea statement:

Main idea: \_\_\_\_\_

- 2a. Group similar ideas together and label each group. On a separate sheet of paper, create an idea map to organize the ideas. Give yourself five minutes; then answer questions 2b and 2c.

b. For me, mapping was  very effective  somewhat effective  not effective

c. Five minutes was  too long  too short  just right

- 3a. On a separate sheet of paper, make an outline to organize the ideas. Give yourself five minutes; then answer questions 3b and 3c.

b. For me, outlining was  very effective  somewhat effective  not effective

c. Five minutes was  too long  too short  just right

- B. **Directions:** To complete your prewriting plan, organize the ideas you generated on page 145, part B. Use mapping or outlining, whichever works better for you. Give yourself five minutes, but take more time if needed. Save your work. You will use your prewriting plan in the next lesson.

### TOPIC

In your opinion, are “No Smoking” sections in restaurants a service to the public, or are they simply a nuisance to smokers?

Present your opinion on the topic. Give reasons and examples to support your view.

- C. **Directions:** After you complete the exercise above, complete this strategy box. If you need more practice, review Unit 2, Lesson 4, “Essay Writing Process: Prewriting.”

### MY TEST-TAKING STRATEGY

The most effective organizing strategy for me is \_\_\_\_\_.

I need \_\_\_\_\_ minutes for organizing.

Answers and explanations start on page 636.

## THE GED ESSAY

## Drafting Your Essay

**Key Ideas**

- Your essay should have an introductory paragraph, body paragraphs, and a concluding paragraph.
- Consult your prewriting plan as you write.
- Each paragraph, and the essay as a whole, should have a clearly stated main idea.

**GED TIP**

*For your GED essay, it's best to put your topic sentence at the beginning of each paragraph. This placement makes your meaning clearest to the scorer.*

**Using Your Prewriting Plan**

As you draft your essay, look back frequently at your prewriting plan. The plan will help you structure your essay and will remind you of ideas to include.

A high-scoring GED essay has:

- An **introductory paragraph** that tells the main idea of the essay and gives a preview of its content
- **Body paragraphs** that expand on main points
- A **concluding paragraph** that summarizes the content of the essay and leaves the reader with something to think about

You will have already determined the main idea of your essay during prewriting. Use the main idea as the basis of your introductory paragraph.

Your idea map or outline should contain two or three main groups of ideas. Each of these groups will be used in a separate body paragraph in the essay. Use the label of each group to develop the topic sentence for that body paragraph. Use the remaining ideas in each group to develop the sentences that help support and explain the topic sentence.

For the concluding paragraph, sum up the main points of the essay. Add a final thought that leaves the reader with something to think about, but do not introduce a new, unrelated idea. Stay on topic.

**Writing Topic Sentences**

Make sure that each paragraph has a topic sentence that contains the main idea. The other sentences in the paragraph are supporting details—facts, reasons, examples, or anecdotes that help prove your case.

For example, the paragraph below compares listening to the radio and watching TV. The topic sentence is underlined. The writer presents his main idea in that topic sentence and then gives three reasons to support it.

I find that listening to the radio is preferable to watching TV. Television demands all my attention, but I can listen to the radio and do something else at the same time. Also, programs on the radio are often more interesting and intellectually challenging. Moreover, radio is less addictive—there are only a few shows that I must listen to each week.

Remember the following key facts about main ideas and topic sentences:

- Each topic sentence must clearly state the main idea of the paragraph.
- The topic sentence should be specific enough to focus the reader's attention on the point of the paragraph.
- The topic sentence should be general enough to cover the supporting details.
- An essay should contain a main idea statement in the introductory paragraph that answers the question in the essay assignment.

---

## THE GED ESSAY ► PRACTICE 3.1

- A. Directions:** Following are three body paragraphs for an essay on the topic below. On separate paper, write an introductory paragraph and a concluding paragraph.

**TOPIC**

Name a job that you would not like to have. Explain why you think it would be an inappropriate job for you.

First of all, taxi drivers work much more than a regular eight-hour shift. Many drivers are on the road from early morning until night. Most of them work at least six days a week rather than a standard five-day workweek. Not only that, but they often work until very late at night—past midnight in some cases. I would certainly not want to be out on the road then.

Second, although the pay can be good at times, it is not regular. When business is slow, the cabbie suffers. Personally, I would rather have a paycheck that I could count on every two weeks. I have a large family to support, and I would be nervous not knowing whether I'd be able to make the rent payment each month.

Finally, the job is not the safest, especially in large metropolitan areas. There have been a number of cases of taxi drivers that were threatened or assaulted by passengers. It is difficult for drivers to defend themselves because the passengers sit behind them. I would prefer a job that had fewer risks.

- B. Directions:** Write a topic sentence for each body paragraph below.

1. \_\_\_\_\_  
One reason to avoid it is that eating sugary foods causes cavities. Also, sweet foods are likely to be fattening, and many people are trying to watch their weight. Finally, white sugar does not have any nutritional value, yet it makes you feel full. Therefore, it keeps you from eating nutritious foods.

2. \_\_\_\_\_  
For one thing, advertising entices people to buy things they don't need and can't afford. People become convinced that their lives will not be complete without designer gym shoes or a new car, and little thought is given to budgetary concerns. In addition, many ads depict extremely attractive models living picture-perfect lives. Ads like that make the person watching feel completely inadequate.

3. \_\_\_\_\_  
First of all, be dependable. Always arrive to work on time, and call if you're going to be late. Second, do the very best job you can. Make the extra effort to get all the details right. Third, try to figure things out on your own, but don't be afraid to ask for help when you need it. It's better to ask a question now and again than to make an expensive mistake.

4. \_\_\_\_\_  
One cause of overeating is depression. It's easy to comfort yourself with food. However, you will get even more depressed when you step on the scale! Easy access to food also causes overeating. Homemakers and people who work at home may overeat because the refrigerator is at hand. Also, nobody is home to see them down an entire chocolate cake or bag of chips. Finally, overeating can also be caused by medical problems. People who think they may have physical reasons for overeating should consult a doctor.

**Answers and explanations start on page 637.**

- II. More freedom
  - A. Make own decisions
  - B. Don't have to adjust to someone else's schedule
    - 1. Stay out late
    - 2. No arguments
  - C. Do what you want

## Strengthening Your Essay

After you have clearly stated your main idea, you need to explain and support it. Work with the ideas from your prewriting plan, and add other ideas as they occur to you. For example, compare the section of the outline shown in the left margin with the body paragraph based on it. Notice how the writer used his prewriting plan while drafting.

Another great thing about being single is that you have more freedom. For example, you can make your own decisions. If you want to make a large purchase or even move across the country, you don't have to ask permission or negotiate with anyone. It's nobody's business except yours. Also, you don't have to adjust to anyone else's schedule. When you want to go dancing until 4 A.M. or watch the late show on TV, you can just do it. You don't have to answer to anyone. There are no arguments or differences of opinion. You are free to do what you want.

As you compared this section of the outline and the paragraph based on it, you probably saw that some ideas in the paragraph don't appear in the outline. The writer thought of them later and added them. Changes like these are a natural part of the writing process. When you are writing a paragraph, feel free to add ideas—as long as they support the topic sentence.

### Using Examples, Specific Details, and Anecdotes

In the paragraph above, the writer developed his ideas by writing them in complete sentences and by adding examples. An **example** is something that illustrates a point. For instance, on the outline the writer used the phrase "Make your own decisions." In the essay, he gave two examples of decision making: making a large purchase and moving across the country.

A **detail** is specific information about your idea. In the paragraph below, the writer added specific details to explain the idea "can develop self more" from the outline. The details he added are underlined.

- III. Can develop self more
  - A. Try out new things
  - B. Have different kinds of relationships

When you are single, you have more time to focus on yourself. Monday through Friday after 5 P.M. and each weekend, time is yours alone—to think about who you are and what you want from life. It's easier to make career changes and to take spur-of-the-moment trips to places you've always wanted to go. You can have a wider variety of relationships too. Every year, I list more and more friends, acquaintances, and co-workers in my address book.

You can also include **anecdotes**, or short real-life stories, to support your point. Sometimes, the best way to illustrate an idea is by telling a story. The paragraph below contains an anecdote.

Sometimes, relaxing can help you with your career. I know that from personal experience. A few years ago, I was very nervous about an upcoming job interview. I prepared for it carefully, but I was still worried. My wife said, "Relax!" The night before the interview, I didn't think about the interview at all. She and I went to a movie instead. The next day, I was completely relaxed, and I got the job!

---

## THE GED ESSAY ► PRACTICE 3.2

**A. Directions:** On a separate sheet of paper, rewrite each paragraph. Add examples, details, or anecdotes.

1. If I had a choice, I would rather live in the country than in the city. First of all, the countryside is beautiful. Also, the air is clean. Finally, the cost of living is lower.
2. My father is the most influential person in my life. He's a very caring person, and he always seems to know the right thing to do in a situation.
3. Winning a lot of money would definitely change my life. The first thing I would do is hire someone to clean our apartment. Then I'd have time to spend on activities I really enjoy.

**B. Directions:** Read the main idea and the groups of ideas listed below. Then write three body paragraphs based on them. Use a separate sheet of paper.

**Main idea:** I would rather own my own home than rent a home.

More control	Better financial investment	More privacy
Can turn heat up or down Can make changes (like build bookcase) No fear that the rent will be raised sky high	When you leave, you sell—get some money back All home improvements benefit you, not the landlord	No landlord marching through your apartment to see how clean it is No prospective tenants coming through

**C. Directions:** Draft an essay on the topic below. Try and complete your draft in 25 minutes, but take more time if needed. Use the prewriting plan that you developed on page 147. Save your work. You will use this draft again in the next lesson.

### TOPIC

In your opinion, are “No Smoking” sections in restaurants a service to the public, or are they simply a nuisance to smokers?

Present your opinion on the topic. Give reasons and examples to support your view.

**D. Directions:** Check your answers to the exercises above. Then complete the strategy box below. If you need more practice, review Unit 2, Lesson 5, “Essay Writing Process: Drafting.”

### MY TEST-TAKING STRATEGY

I need to pay special attention to these areas of drafting. (Check all that apply.)

- Writing an introductory paragraph
- Writing a concluding paragraph
- Writing body paragraphs
- Clearly stating the main idea in a topic sentence
- Using examples, specific details, and anecdotes to support my ideas
- Remembering to look back at my prewriting plan

I need \_\_\_\_\_ minutes for drafting.

Answers and explanations start on page 637.



## Key Ideas

- Revise your work to make sure that the GED scorers can understand it.
- A revision checklist can help you improve your essay as you practice for the GED.

## ON THE GED

You are given some “scratch paper” pages to plan your essay. There will be other pages on which to write your draft.

As you draft your GED essay, be sure to leave a wide margin on both sides of the page so that you can make corrections in the revising and editing stages of the writing process.

## THE GED ESSAY

# Revising and Editing Your Essay

### Revising Your Work

After drafting your essay, you must revise it. Reread your draft to see if any part of it might be unclear. Check both the organization and the sentence structure.

To decide how to revise your essay, ask yourself:

- Is there an introductory paragraph that states the main idea of the essay?
- Is there a concluding paragraph that sums up the main idea?
- Does each paragraph in the body have a clear topic sentence?
- Is there enough support for each topic sentence?
- Are all the sentences in logical places?
- Are paragraph breaks in the right places?
- Does the writing flow smoothly? Have I used transitions?
- Have I removed any irrelevant details?
- Do the ideas in each sentence make sense?
- Are there any short, choppy sentences that could be combined?

Read the essay below, and notice how it has been revised.

A job is much more pleasant when you like and admire your supervisor. A good supervisor must have excellent communication skills and must make it a priority to help workers get ahead.

*communication is a key part of management.*

Supervisors need to give clear directions to spare the workers many hours of frustration. In addition, supervisors should be confident *and decisive.*

~~They should also be decisive.~~ Finally, supervisors should be as honest

as possible. Once they make a decision, they should stick to it, so *that* everyone knows what the policy is.

Good bosses want to see their workers progress. Therefore, supervisors should give lots of encouragement and reward workers who display initiative and problem-solving abilities. *Also,* supervisors should offer opportunities for workers to improve their skills *and education.*

Knowing the qualities of a good supervisor is important for both bosses and workers. The next time you apply for a job, think about whether your prospective boss is a clear communicator who wants you to succeed.

---

## THE GED ESSAY ► PRACTICE 4.1

- A. Directions:** Read the essay below, and revise the problems in sentence structure and organization. Try to complete your revisions in five minutes, but use more time if needed.

Most of us are aware of the consequences of speeding, which range from receiving a speeding ticket to getting into an accident. A quick survey of any highway will show that many drivers exceed the speed limit. Why do people speed? One common reason is that people do not think they will suffer any consequences. If they have never been stopped by the police or crashed their car, they don't see any reason to worry.

People simply need to get somewhere in a hurry. They realize that they are speeding but they have such a need to arrive on time that they don't care. They've got ants in their pants. A final reason is lack of respect for other drivers, one driver who is speeding makes road conditions less safe for everyone. Drivers who act as though they are in the Indy 500 they have no regard for the safety of others.

We know that people speed because of impatience and they don't fear the consequences. Another reason is no respect. Let's figure out what will make them stop.

- B. Directions:** Revise the essay that you wrote on the topic below. Time yourself. Try to complete the revision in five minutes. Save your work. You will use the essay again.

### TOPIC

In your opinion, are "No Smoking" sections in restaurants a service to the public, or are they simply a nuisance to smokers?

Present your opinion on the topic. Give reasons and examples to support your view.

- C. Directions:** After you check your answers to the exercise above, complete the strategy box below. If you need more practice with specific skills and concepts, review Unit 2, "Clear and Organized Writing."

### MY TEST-TAKING STRATEGY

I need to pay special attention to these areas of revising. (Check all that apply.)

- |  |  |
|--|--|
| <input type="checkbox"/> Writing introductory paragraphs     | <input type="checkbox"/> Putting in paragraph breaks           |
| <input type="checkbox"/> Writing concluding paragraphs       | <input type="checkbox"/> Remembering to use transitions        |
| <input type="checkbox"/> Writing topic sentences             | <input type="checkbox"/> Deleting irrelevant details           |
| <input type="checkbox"/> Adding support to body paragraphs   | <input type="checkbox"/> Combining short, choppy sentences     |
| <input type="checkbox"/> Putting sentences in logical places | <input type="checkbox"/> Making sure each sentence makes sense |

I need \_\_\_\_\_ minutes for revising.

Answers and explanations start on page 637.

## Key Ideas

- Edit your work to make sure there are no errors in sentence structure, grammar, usage, or mechanics.
- An editing checklist can help you find errors in your essay as you practice for the GED.

### ON THE GED

*As long as your corrections are neat and readable, you can make corrections. Making changes will not count against you.*

## Editing Your Work

Once you're satisfied with the organization and clarity of your essay, check for other errors in sentence structure, as well as errors in grammar, usage, and mechanics. To edit your essay, ask yourself these questions:

- Are all the sentences complete?
- Are there any run-ons or comma splices that should be corrected?
- Are all lists parallel in structure?
- Are nouns and pronouns used correctly?
- Are verb forms and tenses used correctly?
- Does the subject of each sentence match the verb?
- Is the punctuation correct?
- Is capitalization used correctly?
- Are all words correctly spelled?
- Are there any inappropriate word choices?

► Read the paragraph below, and notice how the errors were corrected.

A job is much more pleasant when you like and admire your supervisor. A good supervisor must have excellent communication skills<sup>✓</sup> and must make it a priority to help workers get ahead. In addition<sup>^</sup>, a supervisor should be a fair and moral person.

Clear communication is a key part of Management. Supervisors need to give clear directions<sup>✓</sup> to spare the workers many hours of frustration. In addition, supervisors should be confident and decisive. Once they made<sup>✓</sup> a decision<sup>^</sup>, they should stick to it so everyone knows what the policy is. Finally<sup>^</sup>, supervisors should be as honest as possible.

Good bosses want to see their workers progress. Therefore, supervisors should give lots of encouragement<sup>✓</sup> and reward workers who display initiative<sup>✓</sup> and problem-solving abilities. Also<sup>^</sup>, supervisors should offer opportunities for workers to improve their skills<sup>✓</sup> and education.

Top-notch supervisors<sup>have</sup> has a high level of moral character. They reward honesty and fire workers who have lied or cheated. Some bosses keep on employees who lie if<sup>their</sup> his skills are valuable to the Company<sup>but</sup>, I feel that this is an example of poor management.

Knowing the qualities of a good supervisor is important for both bosses and workers. The next time you apply for a job, think about whether you're<sup>✓</sup> prospective boss is a moral person and a clear communicator who want<sup>✓</sup> you to succeed.

---

## THE GED ESSAY ► PRACTICE 4.2

- A. Directions:** Read the body of the essay. Correct errors in sentence structure, grammar, usage, mechanics, and word choice. Try to finish editing in five minutes, but use more time if needed.

One common reason for speeding is that people don't think they will suffer any consequences. If they have never been stopped by the Police or crashed their car they don't see any reason to worry.

Another reason is that people simply are needing to get somewhere in a hurry. They realize that they are speeding, but they have such a need to arrive on time that they don't care. Their impatience gets the better of them.

A final reason is lack of respect for other drivers, one driver who is speeding makes road conditions less safe for everyone. Drivers who act as though they are in the Indy 500 get no regard for the safety of others.

- B. Directions:** Edit the essay that you wrote on the topic below. Time yourself and try to complete the edit in five minutes.

### TOPIC

In your opinion, are "No Smoking" sections in restaurants a service to the public, or are they simply a nuisance to smokers?

Present your opinion on the topic. Give reasons and examples to support your view.

- C. Directions:** After you check your answers to the exercise above, complete the strategy box below. If you need more practice with specific skills and concepts, review Unit 3, "Sentence Structure," Unit 4, "Grammar and Usage," and Unit 5, "Mechanics."

### MY TEST-TAKING STRATEGY

I need to pay special attention to these areas of editing. (Check all that apply.)

- |  |  |
|--|--|
| <input type="checkbox"/> Making sure my sentences are complete | <input type="checkbox"/> Matching subjects and verbs             |
| <input type="checkbox"/> Correcting run-ons and comma splices  | <input type="checkbox"/> Making sure punctuation is correct      |
| <input type="checkbox"/> Using parallel structure              | <input type="checkbox"/> Using capitalization correctly          |
| <input type="checkbox"/> Using nouns and pronouns correctly    | <input type="checkbox"/> Making sure words are spelled correctly |
| <input type="checkbox"/> Using verb forms and tenses correctly | <input type="checkbox"/> Choosing appropriate words              |

Answers and explanations start on page 638.

## THE GED ESSAY

## Your Plan of Attack

**Key Ideas**

- Figure out what you must do during every step of the writing process.
- Make a plan to use your time wisely.

**GED TIP**

*Remember: Individual writers may spend different amounts of time on each stage of the writing process. Find out how much time you need.*

When you take the GED essay test, you will have only 45 minutes for all the steps in the writing process. Therefore, you need to walk into the testing center with a plan for how to organize your time wisely.

To create your plan, think about what you need to accomplish during each step of the writing process and how much time it will take you. Ask yourself the following questions:

**Prewriting**

- How long does it take me to generate ideas? What method of generating ideas works best for me?
- How long does it take me to organize ideas? What method of organizing works best for me?

**Drafting**

- How quickly can I write three to five good paragraphs?
- Do I usually remember to leave space in the margins for additions?
- Which parts of drafting do I need to focus on the most?

**Revising and Editing**

- Do I make a lot of changes, or is my first draft usually similar to the final draft?
- Are there certain parts of revising and editing that are especially hard for me? What are they?
- How much time does it take me to revise an essay? How long does it take me to edit?

When trying to decide how much time you need for each step, consider the guidelines on the chart below. The chart shows a suggested time frame for each step of the writing process and a general range—the minimum and maximum amounts of time that should be used.

	General Guidelines	Range
Prewriting (generating ideas and organizing)	10 minutes	5–15 minutes
Drafting	25 minutes	20–30 minutes
Revising and editing	10 minutes	5–10 minutes
Total	45 minutes	

The final step is to fill in a chart that outlines your plan of attack. To get an idea of what you need to do, look at one student's chart on the following page.

### My Plan of Attack

- **Prewriting**

I need 5 minutes.

To come up with ideas, I will brainstorm

To organize ideas, I will make an outline

- **Drafting**

I need 30 minutes.

I will focus on writing three to five good paragraphs, writing a good topic sentence for each paragraph, leaving wide margins, and staying on topic.

- **Revising and Editing**

I need 10 minutes.

I will focus on including enough support, avoiding run-ons and comma splices, matching subjects and verbs, and using commas correctly.

---

## THE GED ESSAY ► PRACTICE 5

**A. Directions:** Complete the chart below to form your essay-writing strategy. Use the page numbers in parentheses to check what you wrote earlier in “My Test-Taking Strategy” boxes.

### My Plan of Attack

- **Prewriting** (page 145)

I need \_\_\_\_\_ minutes.

To come up with ideas, I will \_\_\_\_\_

To organize ideas, I will \_\_\_\_\_

- **Drafting** (page 151)

I need \_\_\_\_\_ minutes.

I will focus on \_\_\_\_\_

- **Revising and Editing** (pages 153 and 155)

I need \_\_\_\_\_ minutes.

I will focus on \_\_\_\_\_

**B. Directions:** Follow your essay-writing strategy as you write an essay on the topic below.

### TOPIC

“If you are told to keep a secret, you shouldn’t break that confidence under any circumstances.” Do you agree or disagree with this statement?

Present your opinion and explain why you feel that way.

Answers and explanations start on page 638.



## Essay Directions and Topic

Below are the essay directions in the exact form that they will appear on the GED test. Read them over and familiarize yourself with them.

### Essay Directions and Topic

Look at the box on the next page. In the box are your assigned topic and the letter of the topic.

You must write on the assigned topic **ONLY**.

You will have 45 minutes to write on your assigned essay topic. You may return to the multiple-choice section after you complete your essay if you have time remaining in this test period. Do not return the Language Arts, Writing Test booklet until you finish both Parts I and II of the Language Arts, Writing Test.

Two evaluators will score your essay according to its overall effectiveness. Their evaluation will be based on the following features:

- Well-focused main points
- Clear organization
- Specific development of your ideas
- Control of sentence structure, punctuation, grammar, word choice, and spelling

**REMEMBER, YOU MUST COMPLETE BOTH THE MULTIPLE-CHOICE QUESTIONS (PART I) AND THE ESSAY (PART II) TO RECEIVE A SCORE ON THE LANGUAGE ARTS, WRITING TEST.**

To avoid having to repeat both parts of the test, be sure to do the following:

- Do not leave the pages blank.
- Write legibly in ink so that the evaluators will be able to read your writing.
- Write on the assigned topic. If you write on a topic other than the one assigned, you will not receive a score for the Language Arts, Writing Test.
- Write your essay on the lined pages of the separate answer sheet booklet. Only the writing on these pages will be scored.

#### **IMPORTANT:**

**The essay that you write is the property of the GED Testing Service (GEDTS) and is considered confidential and secure. GEDTS policy prohibits your discussing or publicizing the topic or content of your essay. This policy also prohibits returning the essay to you, your family, or any other individual or program.**

**TOPIC F**

If you could make one positive change to your daily life, what would that change be?  
In your essay, identify the change you would make. Explain the reasons for your choice.

Part II is a test to determine how well you can use written language to explain your ideas. In preparing your essay, you should take the following steps:

- Read the **DIRECTIONS** and the **TOPIC** carefully.
- Plan your essay before you write. Use the scratch paper provided to make any notes. These notes will be collected but not scored.
- Before you turn in your essay, reread what you have written and make any changes that will improve your essay.

Your essay should be long enough to develop the topic adequately.

Reprinted with permission of the GED Testing Service of the American Council on Education.

## Additional Essay Topics

The essay topics on this page may be used for extra practice.

### TOPIC A

“It’s all right to break a law that is unfair and oppressive.” Do you agree or disagree with this statement?

Discuss the statement above. Give details to support your ideas.

### TOPIC B

What are some ways to develop and support a child’s ethnic identity?

In your essay, explain how ethnic identity can be cultivated and supported. Include specific details and examples.

### TOPIC C

Is it better to live for the moment or plan for the future?

Explain which is the better overall approach and why. Base your answer on your own life experience and personal observations.

### TOPIC D

Why do some people seek attention and enjoy the spotlight?

Discuss the reasons why people seek attention. Use your own life experience, knowledge, and personal observations.

### TOPIC E

What are some of the results of taking risks?

Discuss the effects that risk taking can have on a person. Discuss positive effects, negative effects, or both.

### TOPIC F

What is the definition of a successful person?

Describe the qualities of a person who has truly succeeded in life. Use specific examples in your essay.

### TOPIC G

Do you agree or disagree with the idea that education is the key to freedom?

In your essay, give reasons for your opinion. Use specific details and examples to support your point of view.

## Social Studies

The GED Social Studies Test evaluates your ability to understand and interpret social studies information. You will have 70 minutes to answer 50 questions that are based on reading passages or graphics such as maps, graphs, diagrams, tables, political cartoons, posters, or photographs. You will also answer questions based on an excerpt from an important document in U.S. history (for example, the U.S. Constitution) and one practical document (such as consumer information about buying a product).

The questions are based on material in the areas of U.S. History, World History, Civics and Government, Economics, and Geography.

### Content Areas

**U.S. History (25 percent)** Questions cover such topics as exploration and colonization of the New World, the American Revolution and the founding of the new nation, westward expansion, the Civil War and Reconstruction, industrialization and urbanization, the Progressive Era, the Great Depression, World Wars I and II, and contemporary social, environmental, and technological challenges.

**World History (15 percent)** Questions are based on major topics in early civilizations, feudalism, the Renaissance, nation states, revolutions, world wars, and contemporary global issues.

**Government and Civics (25 percent)** Questions cover topics in federalism, three branches of government, the U.S. Constitution and the Bill of Rights, political parties and elections, and the rights and responsibilities of citizens.

**Economics (20 percent)** Questions include topics such as production, consumption, supply and demand; basics of our economic system, the role of the government in the economy (budget, taxes, regulation, and consumer protection), and labor and consumer issues.

**Geography (15 percent)** Questions cover such topics as hemispheres, continents, and oceans, the relationship between humans and the environment, protecting natural resources, and reading and interpreting maps.

In addition to reviewing material in this chapter, prepare for the GED Social Studies Test by reading newspapers and magazines and listening to news programs on the radio and television. Pay special attention to graphs, maps, and diagrams that you see in the media because 30 out of 50 questions on the test are based on graphics alone or graphics and text together.

## GED TIP

*If you are reading a passage that is hard for you to understand, slow down and try to restate it, sentence by sentence, in your own words.*

## Four Types of Questions

### Comprehension

Some questions on the GED Social Studies Test require you to recognize an implication, restatement, or summary of information that you read.

#### Example

Starting in the 1890s, a group of Republicans known as the Progressives sought to use the federal government to curb the excesses of monopolies. Former Republican President Theodore Roosevelt was the presidential candidate of the Progressive (Bull Moose) Party. His candidacy split the Republican vote and helped Wilson to defeat Republican presidential candidate William Howard Taft in 1912.

Which is the best summary of this passage?

- (1) Republicans opposed the Progressive movement.
- (2) Theodore Roosevelt was President of the United States.
- (3) The Progressives, a splinter group of the Republican Party, helped defeat Taft in 1912.
- (4) William Howard Taft was the Republican presidential candidate in 1912.
- (5) William Howard Taft was elected president in 1912.

**Answer: (3) The Progressives, a splinter group of the Republican Party, helped defeat Taft in 1912.** This summarizes the main idea of the passage. Options (1) and (5) are contradicted by the passage, and options (2) and (4) are specific facts, not a summary of the main point of the paragraph.

### Application

Some of the questions on the Social Studies Test require you to apply given information to a new or specific situation.

#### Example

##### Political Systems

**aristocracy** power held by a small group of people

**democracy** rule by the people or their elected representatives

**military dictatorship** rule by the leadership of the armed forces

**monarchy** rule by one person

**theocracy** government in which laws are seen as divinely ordained

The government of England from 1714 through the 19th century, where king and Parliament alike were under the control of a few families, was an example of which type of system?

- (1) aristocracy
- (2) democracy
- (3) military dictatorship
- (4) monarchy
- (5) theocracy

**Answer: (1) aristocracy** In this question, you apply the definitions to the given situation. Even though the example mentions a king (monarchy), the situation describes rule by a few families (aristocracy)

## Analysis

Many of the questions require you to see the relationships between ideas such as distinguishing facts from opinions, recognizing unstated assumptions, comparing and contrasting, and seeing causes and their effects.

### Example

The prices of goods and services are determined by the relationship of supply to demand. When supply exceeds demand, sellers must lower prices to stimulate sales; on the other hand, when demand exceeds supply, consumers bid prices up as they compete to make purchases.

Based on the theory of supply and demand, what causes prices to rise?

- (1) The supply of a product exceeds the demand for it.
- (2) Sellers try to stimulate sales.
- (3) The demand for a product exceeds its supply.
- (4) Consumers make major purchases.
- (5) Corporations try to make profits for their stockholders.

**Answer: (3) The demand for a product exceeds its supply.** This question asks you to analyze a cause/effect relationship. According to the paragraph, when demand exceeds supply, prices tend to rise. Options (1) and (2) relate to decreasing prices; options (4) and (5) are not based on the paragraph at all.

## Evaluation

Some of the questions involve making judgments about the validity or accuracy of social studies material. These questions also require evaluating the role that values, beliefs, and convictions play in decision making.

### Example

One of the main controversies in the 2000 presidential election was the issue of drilling for oil in the Arctic National Wildlife Reserve. On the one hand, Republican candidate George W. Bush advocated drilling for oil in the Arctic Reserve in order to decrease America's dependence on foreign oil. Democratic candidate Al Gore opposed oil drilling in the Arctic Reserve in order to preserve its environmental purity as a wildlife refuge untainted by modern development.

According to the passage, the controversy over drilling for oil in the Arctic Reserve represented a conflict between which values?

- (1) Democratic and Republican issues
- (2) oil and animals
- (3) drilling and not drilling
- (4) economic independence and environmental protection
- (5) animal protection and wildlife preservation

**Answer:** This question asks you to evaluate the role that values and beliefs play in decision making. Only option **(4) economic independence and environmental protection** represents competing sets of beliefs about priorities. Options (1), (2), and (3) relate to details in the passage, not values, and option (5) is the same thing said two different ways.

### GED TIP

*When you are weighing answer choices, don't rely on your memory alone. Refer back to the passage for the information you need to make the right answer choice.*



## Interpreting Graphics

### Charts

Social studies information is often organized in charts. You need to read down the columns and across the rows to locate information in a chart.

#### Example

Year	Average Hours Worked per Week	Average Hourly Wages*
1910	56.6	\$ 3.63
1930	NA	\$ 4.61
1950	40.5	\$ 9.91
1970	39.8	\$11.32
1990	40.8	\$10.83

\*Adjusted for inflation, in 1990 constant dollars

Between which years did average hours worked rise while average hourly wages fell?

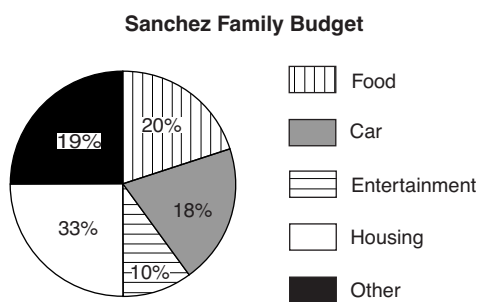
- (1) 1900–1910
- (2) 1910–1930
- (3) 1930–1950
- (4) 1950–1970
- (5) 1970–1990

**Answer: (5) 1970–1990** The chart shows that between 1970 and 1990, there was a one-hour increase in average hours worked and a \$0.49 drop in average hourly wages. The chart doesn't give complete information on options (1), (2), or (3). Option (4) is contradicted by the chart.

### Circle Graphs

Circle graphs are used to show how a whole is divided into parts. Often they are divided into percents or fractions.

#### Example



The greatest portion of the Sanchez family's budget is spent on which two items?

- (1) housing and food
- (2) housing and entertainment
- (3) food and car
- (4) entertainment and food
- (5) entertainment and other

**Answer: (1) housing and food** The Sanchez family spends a total of 53% of their budget on housing and food. All of the other options have totals less than 53%.

#### GED TIP

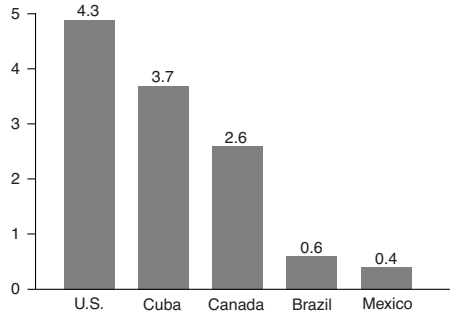
Carefully read all titles and labels on charts and graphs.

## Line and Bar Graphs

You can read line and bar graphs by reading up from the labels on bottom axis (line) and across from values on the side axis. Be sure to read all titles and labels carefully.

### Example

Divorce Rates for Five Countries in the Western Hemisphere\*



\* Per 1,000 population

Which of the following statements is supported by the graph?

- (1) Cuba has the highest divorce rate in the hemisphere.
- (2) Mexico has the lowest divorce rate in the hemisphere.
- (3) The divorce rate in the U.S. is increasing.
- (4) Mexico has a higher divorce rate than Brazil.
- (5) Brazil has a higher divorce rate than Mexico.

**Answer:** The graph supports option (5) **Brazil has a higher divorce rate than Mexico.** Options (1) and (4) are contradicted by the graph. Option (2) is the lowest on this graph, but that doesn't mean it is the lowest of all of the countries in the hemisphere; option (3) may be true, but it is not supported by the graph.

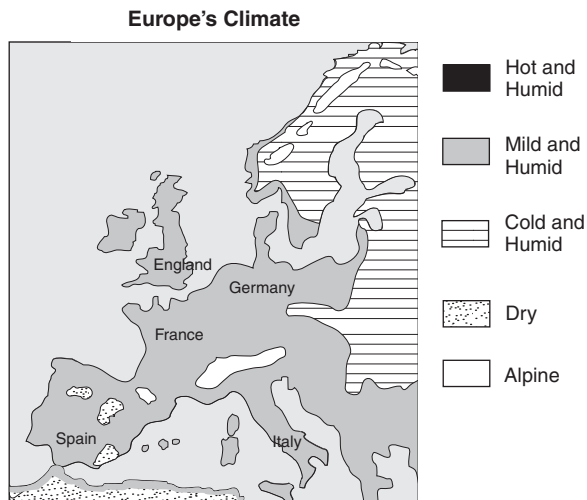
## Maps

You will need to interpret information from maps on the GED Social Studies Test. It is important that you use any map **legend** (also called the **key**) to interpret symbols, **compass rose** to find directions, and **scale** for distances.

### Example

According to the map, what is England's climate?

- (1) hot and humid
- (2) mild and humid
- (3) cold and humid
- (4) dry
- (5) alpine



**Answer:** The map key shows that the medium gray color stands for (2) **mild and humid** climate.

### GED TIP

*Bar graphs help you make comparisons; line graphs help you see trends over time.*

# WORLD HISTORY PRACTICE QUESTIONS

Choose the one best answer to each question.

1. The Germanic tribes that invaded the Roman Empire had relatively simple governments. There were few government officials and taxes. Rulers depended on the loyalty of their warriors rather than on a government bureaucracy. Germanic laws were based on custom and designed to prevent warfare between families.

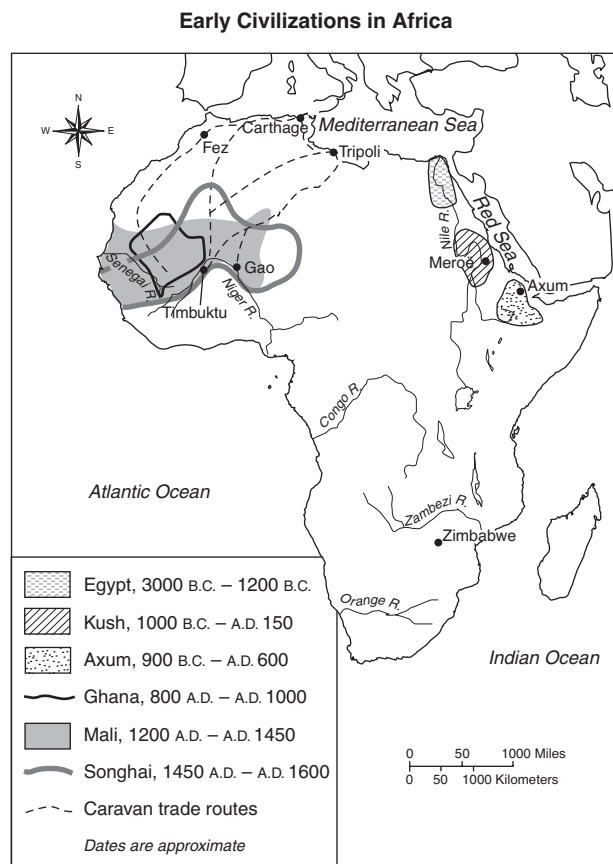
Which of the following is the best title for this passage?

- (1) Government in Germany
  - (2) How Germanic Tribes Governed
  - (3) Germanic Tribes and the Roman Empire
  - (4) The Invasion of the Roman Empire
  - (5) Loyalty Among the Germanic Tribes
2. By the 500s, Hindu beliefs and practices were deeply rooted in Indian culture. In the 900s, Muslim invaders gained control of most of India. There were many points of conflict between the Muslims and the Hindus. The Muslims, who believed in one God, considered the Hindu belief in many gods evil. Muslims also thought that all believers were equal before God, and Hindus believed in a strict caste system in which people's rank in society reflected their spiritual advancement. As a result of these and other differences, Muslims were not absorbed into Hindu society, as previous invaders had been.

Which of the following statements is a conclusion rather than a supporting statement?

- (1) Hindu traditions had become part of the Indian social fabric by the 500s.
- (2) Muslims overran India, gaining political control of the country in the 900s.
- (3) Cultural differences prevented Muslim assimilation into Hindu society.
- (4) A caste system with firm social ranking was characteristic of Hindu society.
- (5) Muslims and Hindus differed in their belief in one God or many gods.

Questions 3 and 4 refer to the following map.



3. Where did the earliest civilizations in Africa develop?
- (1) along the Congo River
  - (2) along the Niger River
  - (3) along the Nile River
  - (4) along the Orange River
  - (5) along the Atlantic coast
4. Which of the following statements is supported by information on the map?
- (1) Over 800 years, several civilizations succeeded one another in western Africa.
  - (2) The longest river in Africa is the Zambesi.
  - (3) The Kingdom of Mali dominated western Africa for more than 500 years.
  - (4) Timbuktu was an important center of learning in Songhai.
  - (5) Gold and salt were transported along caravan trade routes in western Africa.

5. Toward the end of World War II, delegates from fifty nations met and formed the United Nations, an international organization devoted to peace. Member nations agreed to submit disputes to the United Nations for peaceful settlement.

In terms of goals, to which of the following is the United Nations most similar?

- (1) the World Health Organization, formed to coordinate international health activity
- (2) the World Trade Organization, formed in 1994 to enforce trade laws and regulations
- (3) the International Bank for Reconstruction and Development, formed to further international economic development
- (4) the Marshall Plan, a program of loans designed to help Western European nations rebuild after World War II
- (5) the League of Nations, formed at the end of WWI to maintain international peace

6. The mechanization of the textile industry, the invention of the steam engine, and the development of the coal and iron industries contributed to Great Britain's lead in the Industrial Revolution. However, after 1850, other nations began to challenge Great Britain's lead. Belgium, France, and Germany all industrialized quickly. By 1900, natural resources and railroad building helped make the United States the leading industrial nation.

Which of the following is the best summary of this passage?

- (1) The development of natural resources made Great Britain the leader in the Industrial Revolution.
- (2) Many nations, such as Belgium, France, and Germany, industrialized in the 1800s.
- (3) The Industrial Revolution started in Great Britain and spread throughout the world.
- (4) The Industrial Revolution started in Great Britain and spread to Europe, but by 1900 the United States was the leading industrialized nation.
- (5) Plentiful natural resources and a vast railroad system were the underpinnings of the Industrial Revolution in the United States.

7. Gandhi was the popular leader of India's struggle for independence from Great Britain. He backed a policy of nonviolent resistance, boycotting British goods and leading peaceful demonstrations.

Which of the following people was most influenced by Gandhi?

- (1) Charles de Gaulle, French general who set up a government in exile after the Nazi's took over France and led French soldiers to victory against the Germans
- (2) Martin Luther King, Jr., who led peaceful demonstrations to further the cause of civil rights in the United States
- (3) Ho Chi Minh, who led the Vietnamese armed fight for independence from the French and became the leader of North Vietnam
- (4) Soviet leader Mikhail Gorbachev, who was the last leader of the Soviet Union
- (5) Fidel Castro, who led a guerrilla war and took over Cuba, turning it into a communist state

Question 8 refers to the following chart.

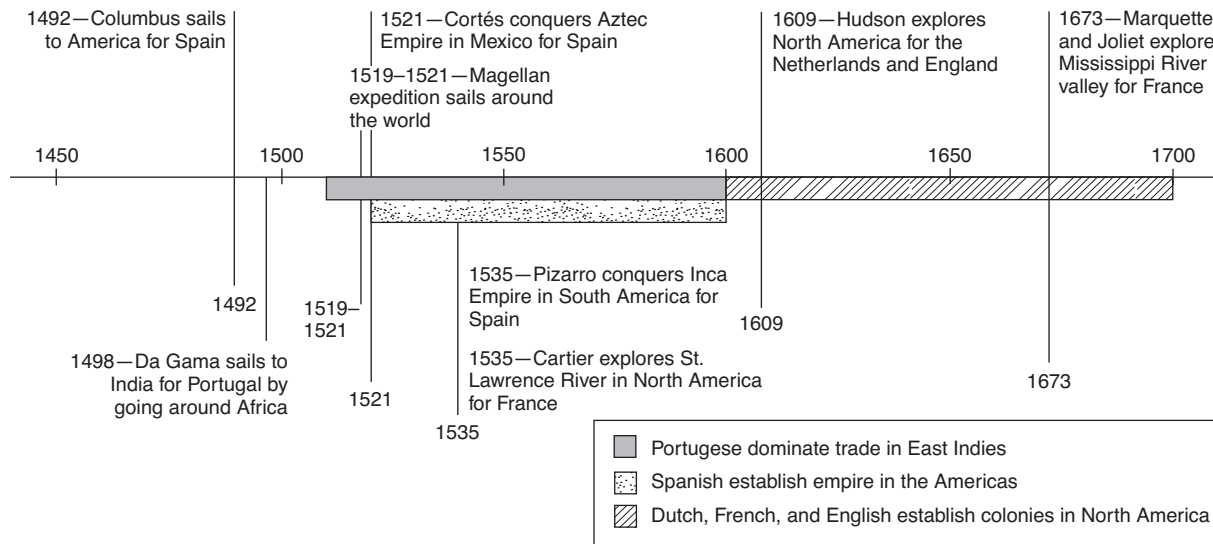
Chinese Governments Since 1271

Government	Description	Years
Yuan	China ruled by Mongol invaders from the northwest.	1271–1368
Ming	China reunified under ethnic Chinese rule.	1368–1644
Ch'ing	China ruled by Manchu invaders from the northeast.	1644–1911
Republic	Provincial rulers, warlords.	1912–1949
People's Republic	Communist revolution led by Mao Zedong.	1949–present

8. What did the Yuan and Ch'ing governments have in common?

- (1) They were led by non-Chinese peoples.
- (2) They lasted 500 years.
- (3) They were overturned by Mongols.
- (4) They were overturned by Manchus.
- (5) They were followed by periods of provincial rule.

Questions 9 through 12 refer to the following time line.

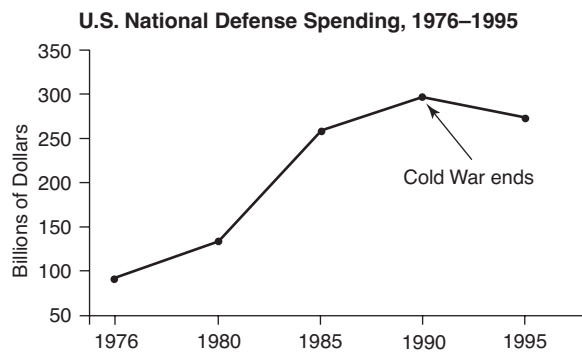


9. Da Gama's voyage opened up trade routes for the Portuguese. Based on the time line, which of the following was a result of his voyage?
- (1) Portugal established large settlements in Africa.
  - (2) Portugal established a colony in Brazil.
  - (3) Portuguese trade in the East Indies grew.
  - (4) The Spanish established an empire in the Americas.
  - (5) The French claimed the St. Lawrence River valley.
10. Which of the following statements is supported by information on the time line?
- (1) Spanish and Portuguese domination of exploration gave way to that of the Dutch, French, and English.
  - (2) Henry Hudson discovered more places in North America than did Marquette and Joliet and Cartier.
  - (3) Both Cartier and Da Gama explored North America on behalf of France.
  - (4) French explorers cooperated with American Indians in establishing trade.
  - (5) Spain dominated the New World for more than three hundred years.

11. Instead of financing expeditions themselves, the rulers of Spain allowed conquistadors to establish outposts in the Americas. The conquistador financed his own expedition, but if he succeeded, he was allowed to keep four-fifths of any treasure he found. Cortés was a conquistador who became rich by conquering the Aztecs in Mexico.
- Which of the following explorers was also a conquistador?
- (1) Da Gama
  - (2) Pizarro
  - (3) Cartier
  - (4) Hudson
  - (5) Marquette

12. Which of the following is the best title for this time line?
- (1) The Spanish Explorers and Empire
  - (2) The Age of Exploration
  - (3) History of the Sixteenth and Seventeenth Centuries
  - (4) European Colonies in the Americas
  - (5) Voyages to the New World

Question 13 refers to the following graph.



13. Which of the following statements is supported by the graph?

- (1) Before the Cold War began, defense spending was at an all-time high.
- (2) Defense spending remained steady throughout the Cold War.
- (3) Defense spending declined steadily during the period 1976 to 1990.
- (4) After the Cold War ended, defense spending began to fall.
- (5) Defense spending was almost 4 percent of the Gross Domestic Product in 1995.

14. When establishing colonies, European nations wanted their colonies to be economically self-sufficient. That meant that each colony paid for its government salaries and the cost of building and maintaining roads, railroads, and government buildings. To do this, European colonists or the colonial governments exported natural resources like gold or copper or grew cash crops like sugar or rubber.

Which of the following statements is an opinion rather than a fact?

- (1) European countries had similar goals in governing their colonies.
- (2) Colonies should be economically independent.
- (3) European nations built railroads, roads, and government buildings in their colonies.
- (4) Colonies provided natural resources that colonists could export.
- (5) Europeans grew cash crops in their colonies.

Questions 15 and 16 refer to the following passage.

During Japan's feudal period, which began during the 1100s, warriors called samurai developed a strict code of conduct. The samurai code, called bushido, emphasized loyalty and obedience to the samurai's lord. It also called for a samurai to lead a simple, courageous, and honorable life. A samurai who violated bushido brought disgrace on himself and his family. To make up for this disgrace, he was expected to commit seppuku, ritual suicide.

15. Which of the following is most similar to bushido?

- (1) chivalry, the way of life of European knights that emphasized personal valor and honor
- (2) appeasement, a process by which an aggressor is satisfied in order to maintain peace
- (3) common law, a system of laws based on the decisions of English royal courts
- (4) conservatism, a philosophy that supports the traditional social and political order
- (5) nirvana, in Hinduism and Buddhism, the ultimate goal of life that consists of the condition of wanting nothing

16. Which of the following did a samurai warrior in feudal Japan probably value the most?

- (1) wealth
- (2) education
- (3) leisure
- (4) recognition of service
- (5) peace

Answers and explanations start on page 642.



## U.S. HISTORY

# Exploration, Colonialism, and the American Revolution

## Key Ideas

- European explorers sought wealth and conquest in the New World from the 1400s to the 1600s.
- The Thirteen Colonies declared independence from England in 1776.
- America won its independence in 1783 and ratified the U.S. Constitution in 1788.

### GED TIP

*Reviewing key vocabulary can help you prepare for the GED test. As you review, look up any words that you do not understand. Pay special attention to the words in **bold type**.*

The first Americans traveled from Asia across the Bering Strait into North America and, over many generations, down to South America. Called **Native Americans**, they established extensive tribal cultures and several advanced civilizations.

In the late 1400s, **explorers** from Europe searched for a sea route to Asia so they could trade for Asian gold and spices. They traveled around the tip of Africa. However, in 1492 Christopher Columbus convinced Spain to finance a trip west, across the Atlantic Ocean. When he reached land, he thought he had found India and called the inhabitants Indians. Later explorers realized that they had found a “New World,” and many European nations set out to establish **colonies** there. The first explorers were searching for valuable resources and for the glory of conquest. This colonization led to tragedy for many Native Americans who died from diseases or were killed, enslaved, or forced off their lands.

In the 1500s and 1600s, European nations, including Spain, France, England, and the Netherlands, established settlements in North America. One type of settlement was established to gain power and wealth. The other was established for permanent residence. The first such English settlement was established in Jamestown, Virginia in 1607. In 1620, the **Pilgrims** sailed to the Americas aboard the *Mayflower* and established a second English colony in Massachusetts. Beginning about 1675, colonists began importing a large number of slaves who had been forcibly taken from Africa. Many were put to work on the plantation system in the Southern colonies.

The colonies grew rapidly in the early 1700s. With France’s defeat in the French and Indian War (1754–1763), England acquired France’s American colonies. After the war, England sought to regain more control over the Thirteen Colonies. It also sought to recover economically from the debts caused by the costly war. New British taxes and policies troubled the colonists; however it was not until 1775 that a war for independence seemed inevitable. After a series of skirmishes, the **Continental Congress** assigned George Washington to lead the Continental Army and ordered publication of the **Declaration of Independence** on July 4, 1776.

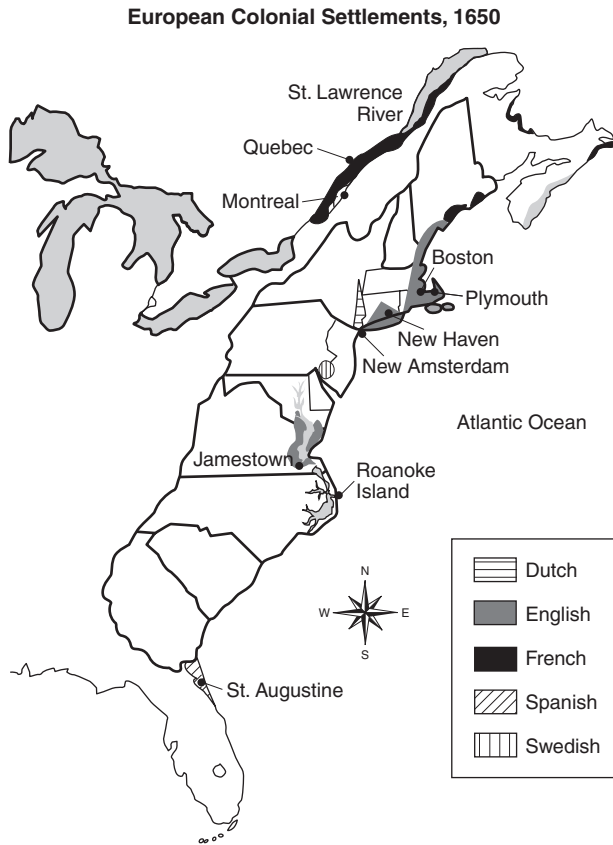
Despite the superiority of the well-trained British forces, the Americans had the advantage of defending their own land and eventually forged a fighting force with strong military leaders. The **American Revolution** lasted until the surrender of the British at Yorktown in 1781. In 1783, the final treaty to end the war resulted in the recognition of American independence. The new nation initially formed a weak national government through the **Articles of Confederation**. This first effort stressed a loose confederation of the states with strong local control. Over time, many colonial leaders recognized the need for a centralized government. The principles of this government were established in the **U.S. Constitution**, which was ratified in 1788. To counter fears of an overly powerful government, the first ten amendments to the Constitution, the **Bill of Rights**, promised many individual freedoms, such as freedom of speech and assembly.



# U.S. HISTORY ► PRACTICE 1

Choose the one best answer to each question.

Questions 1 and 2 refer to the following map.



- Based on the map, which European power had the southernmost colony in 1650?
  - the Dutch
  - the English
  - the French
  - the Spanish
  - the Swedish
- Which of the following conclusions is supported by the map?
  - By 1650, Spain had conquered most of North America.
  - Sweden was a major power in the New World.
  - The English established several colonies in the New World.
  - The Dutch established their colonies in the western part of North America.
  - French colonies extended along the East Coast between Boston and Jamestown.

- Some of the early colonists did not come to the New World to gain power and wealth. These groups came seeking freedom from persecution. Which immigrant group is most similar to those early colonists?

- African slaves who were involuntarily brought to work on plantations
- Mexican workers who came to the U.S. to earn better wages than they could at home
- Chinese students who came to the U.S. to study math and science
- British businessmen who visited the U.S. to invest in media companies
- Haitian refugees who fled to the U.S. to escape a dictatorship

- According to the passage on page 166, which of the following was a cause of the American Revolution?

- France's defeat in the French and Indian War
- increased British taxes and restrictions on the colonies
- the signing of the Articles of Confederation
- Britain's acquisition of France's colonies in North America
- the publication of the Declaration of Independence

- The first amendment to the U.S. Constitution states: "Congress shall make no law abridging the right of the people peaceably to assemble, and to petition the government for a redress of grievances."

What is the most likely reason the framers of the Constitution included these guarantees?

- They did not like Congress.
- They were planning to organize assemblies.
- They were concerned about the government becoming tyrannical.
- They were hoping to petition the government.
- They were attempting to prevent a redress of grievances.

**Answers and explanations start on page 638.**

## U.S. HISTORY

Westward Expansion  
and the Civil War**Key Ideas**

- The economy of the South was based on slavery. The Northern economy was based on free labor.
- Conflict over whether slavery should be allowed in the nation's new western territories led to the Civil War.
- The North won the war and ended slavery. During Reconstruction, the South was rebuilt.

**GED TIP**

*As you study for the GED Social Studies Test, focus on analyzing events to understand causes and effects, rather than memorizing names and dates.*

Early on in the history of the United States, the North and the South diverged economically. The North developed a varied economy that included industry and commerce as well as agriculture. Slavery had been legal throughout the North during the colonial period. However, by the early 1800s, it was **abolished** in all Northern states. Women and **immigrants**, as well as men, provided labor for the growing economy in the North.

The Southern economy was based largely on agriculture. By the 1800s, there was one major crop in the South: cotton. Planting and harvesting cotton required a lot of labor. Southern farmers came to depend more and more on slaves to do the work, and the number of enslaved persons grew in the South.

As the United States expanded during the early 1800s, the North and the South worked to maintain a balance of power. New states were generally added in pairs, one slave and one free. But there was increasing tension over the vast western territory that had become part of the United States by the mid-1800s. In the 1850s, Congress voted that the territories themselves should decide whether or not to allow slavery. This soon led to war in Kansas. People from both the North and the South rushed to settle the territory. Vote fraud in the 1855 elections led to the set up of two warring governments. The violence in Kansas foreshadowed the violence that soon tore up the nation.

In the late 1850s, political parties fractured over the slavery issue. Four candidates ran for president in 1860. Abraham Lincoln, who promised to halt the spread of slavery (although not abolish it where it already existed) won. Opposed to Lincoln's policies, most slave states **seceded** from the United States. They set up their own government, called the **Confederacy**. By April 1861, the United States (called the **Union**) and the Confederacy were at war.

At first it seemed as if the Confederacy might win. They had well-trained military leaders and soldiers who were willing to fight hard to hold onto their way of life; so the Confederacy won many early battles. However, by the summer of 1863, the Confederacy began to wear down. Because the South lacked industry, ammunition, uniforms, and shoes were in short supply for Confederate soldiers. There were food shortages for soldiers and civilians alike. The war was fought mostly in the South and the destruction was terrible. After four long years, in 1865, Confederate general Robert E. Lee surrendered to Union general Ulysses S. Grant. The Civil War ended.

For the next 12 years, federal troops oversaw the rebuilding of the South. This period was called **Reconstruction**. Schools were established for former slaves, who were all freed when the war ended. However, the **sharecropping** system, which kept black farmers enslaved economically, soon came into being. Whites who came back to power in the South in the 1870s prevented African Americans from exercising their right to vote. The Civil War ended slavery, but it did not end racism. And the entire nation has suffered for it.

## U.S. HISTORY ► PRACTICE 2

Choose the one best answer to each question.

- Based on the passage, which of the following disagreements was a main cause of the Civil War?
  - whether cotton should be the main crop in the South
  - whether the North should become more agricultural
  - whether slavery should continue to exist
  - whether the United States should expand westward
  - whether slavery should be permitted in territories in the West
- In 1820, Missouri proposed to enter the Union as a slave state. Based on the passage, what do you think was the response of Northerners in Congress?
  - They supported having another slave state join the Union.
  - They lobbied against having Missouri join the Union as a slave state.
  - To balance the admission of Missouri, they lobbied to have Maine admitted as a free state.
  - They proposed adding a western territory to the Union instead.
  - They started a war to prevent Missouri from attaining statehood.
- In the mid-1900s, the country of Vietnam was divided. There was a communist government in the North and a noncommunist government in the South. The two fought for control of Vietnam. In 1975, the communists won. Vietnam was united under this form of government.

Based on this information, how was the war in Vietnam similar to the U.S. Civil War?

- Both wars involved racial conflict.
- Other nations sent soldiers to fight in both wars.
- In both wars, the addition of new territory had upset the balance of power.
- At the end of each of these wars, the nation was reunified.
- At the end of each of these wars, two separate, new nations were formed.

Questions 4 and 5 refer to the following photographs of people who served in South Carolina's state government in 1868.



Photography by Katherine Wetzel. Reprinted with the permission of The Museum of the Confederacy, Richmond, Virginia.

- Which of the following is a fact confirmed by information in the photographs?
  - Politicians in power in the South during Reconstruction were called Radical Republicans.
  - Southern Democrats were treated very well during Reconstruction.
  - It was unfair that former Confederate soldiers could vote during Reconstruction.
  - In 1868, many African Americans served in the government of South Carolina.
  - The most qualified leaders in South Carolina government in 1868 were African Americans.
- Which of the following conclusions is supported by the photographs and the passage on page 168?
  - Over the course of Reconstruction, blacks in the South gained and then lost political power.
  - Over the course of Reconstruction, blacks in the South lost and then gained political power.
  - Over the course of Reconstruction, whites in the South gained and then lost political power.
  - In the early years of Reconstruction, blacks served in government in each Southern state.
  - In the early years of Reconstruction, blacks served only in South Carolina's government.

Answers and explanations start on page 638.

## U.S. HISTORY

## Industrialization, Immigration, and the Progressive Era

**Key Ideas**

- The U.S. underwent rapid industrialization starting in the mid-1800s.
- Immigrants came from many places to work in the expanding American industries.
- Rapid industrialization brought problems, which labor unions and reformers tried to solve, especially during the Progressive Era.

**ON THE GED**

*The GED Social Studies Test examines your ability to interpret graphs, charts, maps, and other visual sources of information.*

In the mid-1800s, American industries, which had been growing steadily since the late 1700s, began a period of extremely fast growth. This rapid **industrialization** occurred for several interconnected reasons. With the addition of the vast western territories, the United States gained plentiful **natural resources**. Among these resources were materials, such as metals, needed to manufacture new products and machines, and fuels, such as coal, needed to run these machines. Another reason for rapid industrialization was the invention of many new machines and new industrial processes. With these new inventions and processes, manufactured goods could be produced more easily, more efficiently, and less expensively. A third reason for the rapid industrialization was the nation's booming population. The U.S. population more than doubled in the last forty years of the 1800s. There were more people to buy more goods, spurring commerce and further industrial growth.

Rapid industrialization meant that many new factories were built in the mid- and late 1800s. Most were built in or near the nation's large cities, including New York, Boston, Chicago, Philadelphia, and Pittsburgh. These urban centers had large groups of people who could work in the factories and large groups of people who would buy the goods the factories produced.

U.S. factory jobs drew many **immigrants** to American cities. Although the United States has always been a "nation of immigrants," the late 1800s saw a sharp rise in the number of people moving here from foreign countries. The majority came from Europe, including Germany, Italy, Russia, and Eastern European countries. Many also came from Mexico and Central America. Asian immigration was declining because the government had passed laws barring Chinese from moving to the United States. However, thousands of Japanese came to this country, taking jobs in farm fields and mines.

America's factory workers, whether native- or foreign-born, worked very hard at grueling, dangerous work. Many received low pay for long hours on the job. Over time, workers began to unionize. By joining a **union**, workers pledged to work together for better and safer working conditions and higher wages. They called **strikes** when their employers cut their pay or refused to grant raises. Many of the laws we have today, including the eight-hour workday and the five-day workweek, came about through the bitter struggles for better working conditions that unions waged in the late 1800s and the early 1900s.

Unions weren't the only groups working to solve problems brought on by America's rapid industrialization. Some reformers worked to clean up slums, improve the health care, and stop child labor. Others worked to preserve the nation's natural beauty by creating National Parks. Still others worked to give more people a voice in government. For example, many women lobbied to gain the right to vote. In the early 1900s, groups were working toward so many sweeping social and political improvements that the time is called the **Progressive Era**.

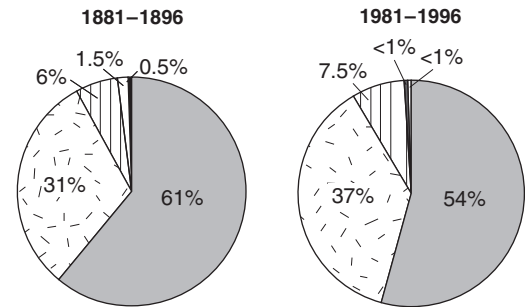
## U.S. HISTORY ► PRACTICE 3

Choose the one best answer to each question.

- Which of the following always occurs during a period of rapid industrialization?
  - (1) the annexation of new territory
  - (2) an increase in manufacturing
  - (3) an increase in population
  - (4) an increase in immigration
  - (5) increased unionization of the labor force
- Which event directly contributed to the growth of American industries in the mid-1800s?
  - (1) the passage of the Chinese Exclusion Act, which banned Chinese immigration
  - (2) the passage of the Sherman Antitrust Act, which helped prevent businesses from forming monopolies
  - (3) the development of the Bessemer process, which made it easier to produce steel
  - (4) the development of settlement houses to aid impoverished immigrants and city dwellers
  - (5) the adoption of the direct primary, which allowed voters, rather than political parties, to choose candidates
- Based on the passage, which of the following would early union workers have valued the most?
  - (1) productivity in the workplace
  - (2) contact with people of all different backgrounds
  - (3) cooperation with others to improve worker safety
  - (4) the freedom of self-expression
  - (5) the freedom to work whenever they pleased
- What was a strong ideal held by people working toward reforms during the Progressive Era?
  - (1) efficiency
  - (2) wealth
  - (3) artistic beauty
  - (4) scholarship
  - (5) fairness

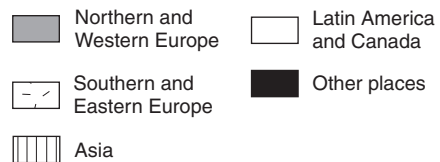
Questions 5 and 6 refer to the following graphs.

Places of Origin of Immigrants to the United States



SOURCE: *Historical Statistics of the United States*

SOURCE: U.S. Bureau of Census.



- Based on the first graph, in the late 1800s, where did most immigrants to the United States come from?
  - (1) Northern and Western Europe
  - (2) Southern and Eastern Europe
  - (3) Asia
  - (4) Latin America and Canada
  - (5) Australia and Antarctica
- Based on the graphs, what was a major difference between U.S. immigration in the late 1800s and U.S. immigration in the late 1900s?
  - (1) There was a smaller percentage of immigrants from Northern and Western Europe in the late 1800s than in the late 1900s.
  - (2) There was a smaller percentage of immigrants from all of Europe in the late 1800s than in the late 1900s.
  - (3) There was a smaller percentage of immigrants from Asia in the late 1800s than in the late 1900s.
  - (4) There was a larger percentage of immigrants from the Americas in the late 1800s than in the late 1900s.
  - (5) There was a larger percentage of immigrants from Russia in the late 1800s than in the late 1900s.

Answers and explanations start on page 638.



## U.S. HISTORY

# The United States as an Emerging World Power

## Key Ideas

- Industrialization spurred U.S. interest in gaining access to the raw materials and markets of other countries.
- The U.S. pursued imperialist policies in the late 1800s.
- The U.S. entered both WWI and WWII on the side of the Allies and contributed to their winning both wars.

## GED TIP

*When weighing answer choices, immediately eliminate ones that are directly contradicted by information in the passage or graphic.*

The expansion of U.S. industries in the mid-1800s had an effect not only on the nation's economy but also on its politics. Business and government leaders wanted access to more natural resources, which industries needed to continue growing. They also wanted to be able to sell more goods overseas. Regions in Africa, Asia, and Latin America had rich natural resources. People in these regions might buy what Americans wanted to sell. To promote industrial growth and increase its power, the United States became imperialistic. **Imperialism** is the policy by which a stronger nation extends economic, military, and/or political control over a weaker nation or region.

European nations had been engaging in imperialism for many centuries. In the late 1800s, the United States joined in. In 1898, the United States fought the Spanish-American War. Ostensibly, the United States declared war on Spain because of Spain's mistreatment of Cuba, which was a Spanish colony. Yet, after winning the war, the United States took over Spain's colonies of Cuba, Puerto Rico, the Philippines, and Guam. It granted independence to none of them.

The next war the United States was involved in was World War I, which began in Europe in 1913. It pitted two groups of nations against each other. One group was called the **Allies**; the leading Allied nations included Great Britain, Russia, and France. The other group was called the **Central Powers**, which included Germany, Austria-Hungary, and the Ottoman Empire. The Allies and Central Powers fought for three years in what fast became a deadly stalemate. Then, in 1917, the United States, alarmed over Germany's sinking of American ships, joined the Allies. With American help, in November 1918 the Allies defeated the Central Powers and World War I ended.

Because the destruction was so terrible, some people called World War I "the war to end all wars." However, this was not to be. Within twelve years, by 1929, the world had fallen into a serious economic downturn, which Americans called the **Great Depression**. Economic problems aided the rise of **fascism** in Europe and elsewhere. Fascist nations squelched democracy and advocated the takeover of other nations. Germany, led by fascist dictator Adolf Hitler, started attacking smaller nations in Europe in the mid-1930s. Italy fought to take over Ethiopia, in Africa. Japan attacked China. Hitler built an alliance with Italy and Japan, which came to be called the **Axis**. By 1939, war again broke out between the Axis and the Allies.

The United States did not enter World War II until 1941, when the Japanese bombed the U.S. naval base at Pearl Harbor in Hawaii. This time, Americans fought not only in Europe but also in Africa and Asia as well. With its horrific battles, the fire-bombing of cities, the **Holocaust**, and the dropping of two atomic bombs on Japan, World War II led to the greatest destruction and despair the world has ever known. The United States, which played a major part in the Allied victory in World War II in 1945, also played a major part in helping to rebuild war-scourged nations after the war was over.



## U.S. HISTORY ► PRACTICE 4

Choose the one best answer to each question.

Question 1 refers to the following chart.

**Factors Related to the Growth of Imperialism**

Economic: Focusing on Resources	Desire for greater access to raw materials and fuels
Economic: Focusing on Markets	Desire for more places to sell agricultural or industrial goods
Military: Focusing on Refueling	Desire for control of ports that could serve as refueling stations for long sea voyages or air flights
Military: Focusing on Defense	Desire for control of places that could aid in national defense
Political	Desire to spread the institutions of democracy or other political systems
Religious	Desire to spread Christianity or other faith
Cultural/Racial	Lack of respect for different cultures or races

1. Cuba lies about 90 miles off the coast of Florida. After the United States freed Cuba from Spanish rule in 1898, the U.S. Navy built an important base there.

Which factor related to imperialism does this situation best illustrate?

- (1) economic/resources
  - (2) military/refueling
  - (3) military/defense
  - (4) political
  - (5) cultural
2. What assumption do you need to make to fully understand the last sentence in paragraph 4 on page 172?
- (1) In World War I, the Allies fought the Central Powers.
  - (2) In World War II, the Allies included England, France, and Russia.
  - (3) In World War II, the Allies included the Germans, Austrians, and Ottoman Turks.
  - (4) In World War II, the Axis included Germany, Italy, and Japan.
  - (5) World War II lasted longer than World War I did.

3. Franklin D. Roosevelt became president during the height of the Great Depression, in 1933. He soon instituted a set of federal programs called the New Deal to try to lower unemployment.

Which conclusion about the effectiveness of New Deal programs does the graph below support?



SOURCE: *Historical Statistics of the United States*

- (1) Within a year, the New Deal had raised unemployment to its pre-Depression level.
  - (2) Within a year, the New Deal had lowered unemployment to its pre-Depression level.
  - (3) The New Deal had no effect on unemployment.
  - (4) The New Deal lowered unemployment, but U.S. entry in World War II lowered it further.
  - (5) The New Deal lowered unemployment, but Allied victory in World War II lowered it further.
4. Which statement best summarizes the main idea of paragraph 5 on page 172?
- (1) America entered World War II in 1941.
  - (2) Americans fought in Europe, Africa, and Asia.
  - (3) World War II involved more nations than any other war ever fought.
  - (4) America took a strong leadership role during and after World War II.
  - (5) People have learned from the worldwide conflicts of the 1900s how horrible war can be.

Answers and explanations start on page 639.

## U.S. HISTORY

## Facing Enduring Challenges

**Key Ideas**

- The Cold War dominated U.S. foreign policy from the end of WWII until the fall of the Soviet Union.
- Social changes in the U.S. in the mid-1900s included the expansion of civil rights for minorities.
- Technological advances have introduced benefits but also caused problems.

**ON THE GED**

*The GED Social Studies Test will include some questions that focus on the role of the United States in the world.*

After World War II ended, the capitalist and communist nations soon began engaging in a power struggle called the **Cold War**. Leading the capitalist nations was the United States; leading the communist nations was the Soviet Union. The Cold War never led to direct fighting between these two superpowers, although there was a constant threat of nuclear war. Clashes between communism and capitalism did lead to numerous smaller conflicts. These included the Korean War of the early 1950s and the Vietnam War, which lasted from 1954 to 1975. The United States sent soldiers to both. The Vietnam War was long and difficult and caused deep division among Americans. The United States sent massive military aid to the noncommunist South Vietnamese, but they kept losing to the communist North Vietnamese. Although a few Americans wanted to continue fighting, in 1973 America pulled out of Vietnam. In 1975, the communists took over the country.

The Cold War ended in 1991 with the breakup of the Soviet Union and the end of communism there. In the late 1980s, Soviet leader Mikhail Gorbachev had tried to reform the communist government. But, the loosening of Soviet control had led to the collapse of many communist governments of Eastern Europe. The Berlin Wall, which had separated East and West Germany, was torn down. With communism no longer so threatening, world politics became less tense but also more unpredictable.

During the second half of the twentieth century, the United States continued to face many challenges. In the 1950s, African American leaders launched the **civil rights movement** to try to end segregation and discrimination in the United States. Among their victories included the integration of public schools and other public facilities, the passage of laws protecting the voting rights of minorities, and the striking down of laws that permitted overt discrimination based on race or cultural background. However, minority groups and people of all backgrounds concerned about fair application of the law have continued to be vigilant in insisting that civil rights laws be upheld.

Another area of challenge in recent decades has been **technology**. Technology has led to many advances in science, medicine, and our personal lives. Computers, for instance, make many jobs easier and more productive. They allow almost instantaneous communication with co-workers, family, and friends. Furthermore, they allow people from around the world to share information quickly and easily, giving us the sense that we live in a “global village.” However, our reliance on the use of technology has led us to pollute the air with exhaust from a growing number of cars. It has led us to pollute the water with acid rain, resulting from burning coal to generate increased electricity. It has led us to pollute our land with mountains of trash and tons of hazardous wastes.

American ingenuity and spirit have led to great advances in technology and in building a just society. Americans can continue to use creativity and skills to solve the problems we face in this new millennium.

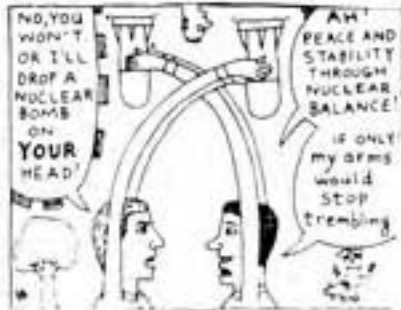
## U.S. HISTORY ► PRACTICE 5

Choose the one best answer to each question.

1. Why was the conflict between the United States and the Soviet Union called the Cold War?

- (1) It involved communists and capitalists.
- (2) It involved Korea and Vietnam.
- (3) It occurred in the Northern Hemisphere.
- (4) There was a constant threat of nuclear war.
- (5) The two superpowers never actually fought.

2. Which of the following best summarizes the message of the cartoon below?



© 1980 Mark Alan Stamaty. Reprinted with permission of Mark Alan Stamaty.

- (1) Holding a bomb over someone's head is difficult.
- (2) Nuclear bombs are extremely destructive.
- (3) Expanding U.S. nuclear capabilities is a good idea.
- (4) The build-up of nuclear arms increases fear and instability, not peace.
- (5) The threat of nuclear war is lessened if both superpowers have equally powerful weapons.

3. Which of the following statements about the Vietnam War is a false generalization?

- (1) Some Americans served in both Korea and Vietnam.
- (2) The Vietnam War was a clash between communists and noncommunists.
- (3) The United States sent massive military aid to South Vietnam.
- (4) Americans were in complete agreement about pulling out of Vietnam.
- (5) The Vietnam War lasted much longer than the Korean War.

4. What caused the Cold War to end?

- (1) the destruction of the Berlin Wall
- (2) the fall of communism in the Soviet Union
- (3) the threat of communism in Eastern Europe
- (4) the separation of East and West Germany
- (5) the death of Mikhail Gorbachev

5. Which of the following goals would a civil rights activist be most likely to pursue?

- (1) getting the courts to uphold laws that restrict access to personal computer files
- (2) getting Congress to enact laws to restrict the sale of firearms
- (3) working for a city law requiring realtors to sell property to anyone who is able to buy it
- (4) getting local companies to stop polluting the environment
- (5) working with local clergy to publicize a worship service open to people of all religions

6. Which of the following is a conclusion about technology rather than a supporting detail?

- (1) Reliance on technology has increased pollution.
- (2) Cars cause air pollution.
- (3) Coal-generating power plants cause acid-rain pollution.
- (4) The ease of manufacturing disposable items has led to land pollution at landfill sites.
- (5) Hazardous wastes generated from increased manufacturing have polluted the land.

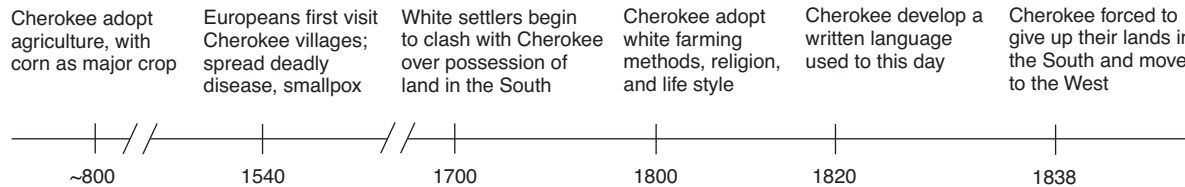
Answers and explanations start on page 639.

# U.S. HISTORY PRACTICE QUESTIONS

Choose the one best answer to each question.

Questions 1 and 2 refer to the time line below.

Important Events in Early Cherokee History



1. Which of the following is a conclusion based on the time line?

- (1) The Cherokee had begun farming around 800, before Europeans came to America.
- (2) Clashes between Cherokee people and white settlers coming into the South started in the 1700s.
- (3) Although the Cherokee adopted many aspects of white culture, they were driven off their ancestral lands.
- (4) The Cherokee traditionally considered land ownership to be a tribal matter rather than a right of individuals acting on their own.
- (5) The Bible was one of the first books the Cherokee translated into their written language.

2. When President Andrew Jackson mandated that the Cherokee move west in 1830, he claimed that the U.S. government would be better able to protect the Cherokee from whites who might try to get their new land in the West. The Cherokee considered this to be illogical.

Which of the following summarizes the logical fallacy?

- (1) If the government can't protect us from white settlers here, now, how could it protect us from whites moving west in the future?
- (2) If you ask us to move to the West now, how do we know you won't ask us to move back to the South in the future?
- (3) If the land we have in the South is good, why wouldn't the land in the West be better?
- (4) If the state governments are protecting us now, why can't the U.S. government help later?
- (5) If we have our own farms now, why wouldn't we have bigger farms later?

3. In the late 1700s, Abigail Adams—wife of John Adams, who was our nation's second president—wrote the following in a letter to her sister:

I will never consent to have our sex considered in an inferior point of light. Let each planet shine in their [its] own orbit . . . if man is Lord, woman is *Lordess*—that is what I contend for.

Based on this letter, which of the following principles was Abigail Adams advocating?

- (1) the separation of church and state
- (2) the abolition of slavery
- (3) the promotion of scientific learning
- (4) equal rights and opportunities for women
- (5) freedom of expression

Questions 4 and 5 refer to the following map.



4. Which of the following sets of states had slavery but did not join the Confederacy?

- (1) Maine, Vermont, Ohio, Iowa, and Oregon
- (2) Pennsylvania, West Virginia, Tennessee, and Texas
- (3) Delaware, West Virginia, Kentucky, and Missouri
- (4) Arkansas, Missouri, Indian Territory, and Kansas
- (5) Dakota Territory, Nebraska Territory, New Mexico Territory, and Arizona Territory

5. The loyalty of Maryland was of crucial importance to the Union. Based on the map, which statement best explains why this was so?

- (1) The nation's capital was located nearby.
- (2) The Confederate capital was located there.
- (3) It was close to Fort Sumter, where the Civil War began.
- (4) It was close to Pennsylvania, where the Battle of Gettysburg was fought.
- (5) Important rail lines ran through Baltimore.

6. In the Emancipation Proclamation, issued in 1863, President Lincoln freed all people enslaved in the states that had seceded from the Union. This proclamation was explicitly not to be put into effect in slave states that had remained in the Union. The proclamation went on to say:

I hereby enjoin upon the people so declared to be free to abstain from all violence . . . and make known that such persons of suitable condition will be received into the armed services of the United States to garrison forts, positions, stations, and other places, and to man vessels of all sorts.

Based on the information given about the Emancipation Proclamation and the text of the order itself, which of the following was a major reason Lincoln issued the proclamation?

- (1) to encourage states to secede from the Union
- (2) to abolish slavery in the Union
- (3) to punish slaveholders throughout the South
- (4) to weaken the North by enlisting former slaves in the Confederate army
- (5) to weaken the South by enlisting former slaves in the Union army



Questions 7 through 9 refer to the following chart.

**Civil Rights Amendment and Laws**

14th Amendment (1868)	Granted citizenship and equal protection of the law to all persons born in the United States (not applied to American Indians)
15th Amendment (1870)	Granted voting rights to African Americans
Civil Rights Act of 1875	Gave African Americans the right to serve on juries Banned racial segregation in public places
Civil Rights Act of 1964	Outlawed segregation by race in public places and racial discrimination in employment
Voting Rights Act of 1965	Prohibited literacy tests for voting Allowed the federal government to register voters
Civil Rights Act of 1968	Outlawed discrimination in the sale or rental of homes

7. Based on the chart, in which situation would the civil rights law passed in 1965 apply?
- (1) An Asian American registers to vote and is given a reading test.
  - (2) An African American family is asked to give up their seats on a bus to a white family.
  - (3) An American Indian applies for a job but is told that dark-skinned people will not be hired.
  - (4) A Haitian man goes to a restaurant in a Cuban neighborhood but is told that he will not be served.
  - (5) An Hispanic couple wants to buy a house in an African American neighborhood but they are told to look elsewhere.
8. Which statement best summarizes what this chart shows about voting rights?
- (1) African Americans were granted the vote five years after the Civil War ended.
  - (2) African Americans were granted the vote 100 years after the Civil War ended.
  - (3) African Americans were granted the vote soon after the Civil War, but laws enforcing these rights had to be passed a century later.
  - (4) African Americans were granted the vote in 1870 but American Indians were never granted these same rights.
  - (5) Literacy tests to prove a person was qualified to vote began to be used in 1965.
9. How are the Civil Rights Act of 1875 and the Civil Rights Act of 1964 similar?
- (1) They both guaranteed African Americans citizenship rights.
  - (2) They both prohibited the legal separation of people by race in public places.
  - (3) They both ensured that African Americans could serve on juries.
  - (4) They both make job discrimination illegal.
  - (5) They both protected voters by allowing the federal government to take charge of voter registration.
10. Alexander Graham Bell invented the telephone in the spring of 1876. In the fall, he exhibited it at an exposition in Philadelphia. When leading scientists saw Bell's invention, they said, "Here is the greatest marvel ever achieved in electrical science."
- Which of the following statements related to the passage is an opinion, not a fact?
- (1) Alexander Graham Bell was the inventor of the telephone.
  - (2) Bell invented the telephone in 1876.
  - (3) Bell exhibited the telephone at an exposition in Philadelphia.
  - (4) Scientists admired Bell's invention.
  - (5) The telephone was the greatest electrical invention ever.



Questions 11 through 13 are based on the paragraph and the political cartoon below.

In 1974, President Richard Nixon resigned from office. He had been involved in a scandal known as Watergate. The Watergate scandal implicated Nixon in covering up crimes committed by members of his reelection committee. These crimes ranged from illegally harassing political opponents to burglary and bribery. With Congress investigating him, he was sure to be impeached. This cartoon was published before Nixon resigned to avoid impeachment.



Cartoon by Robert Lawlor. Reprinted with permission of the "Philadelphia Daily News."

11. In this cartoon, whom is Nixon addressing?

- (1) the writers of the Declaration of Independence
- (2) the framers of the U.S. Constitution
- (3) the past presidents of the United States
- (4) the present session of Congress
- (5) the Watergate burglars

12. Which value was Congress furthering by investigating Nixon and Watergate?

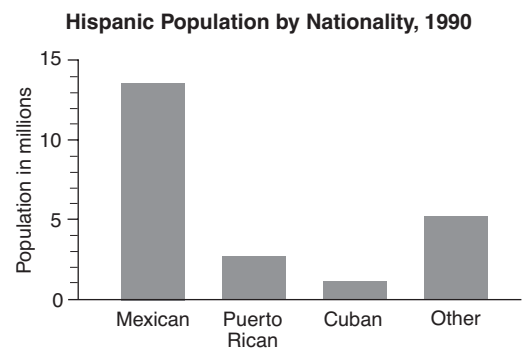
- (1) the search for happiness
- (2) the pursuit of justice
- (3) the duty of obedience
- (4) loyalty to a friend
- (5) love of mercy

13. About Watergate one historian has written, "In a society in which distrust of leaders and institutions of authority was already widespread, the fall of Richard Nixon seemed to confirm the most cynical assumptions about the character of American public life."

What was a main reason for Americans' growing distrust of their government in the years just prior to Watergate?

- (1) the horrors of the Civil War
- (2) mismanagement of the New Deal
- (3) the beginning of rock music
- (4) the escalation and failure of the Vietnam War
- (5) the scandals of previous presidents, including John Kennedy and Bill Clinton

Questions 14 and 15 refer to the graph below.



SOURCE: U.S. Census Bureau

14. In 1990, about how many people of Cuban nationality lived in the United States?

- (1) 100
- (2) 270
- (3) 100,000
- (4) 1,000,000
- (5) 5,000,000

15. A Hispanic family moves into the apartment next door to you. Based only on the bar graph, which place is the family most likely to be from?

- (1) Cuba
- (2) Mexico
- (3) Puerto Rico
- (4) Spain
- (5) Peru

**Answers and explanations start on page 639.**

## WORLD HISTORY

## Early Civilizations

**Key Ideas**

- Ancient civilizations developed where people could settle in one place with a secure food supply.
- The ancient republics of Greece and Rome were incubators for important ideas in modern government.
- Ancient civilizations also left legacies in art, architecture, science, and astronomy.

**ON THE GED**

*The world history questions require that you have familiarity with major topics in world history. You do not need to memorize names or dates.*

One of the earliest known **civilizations** is ancient Egypt. By 5000 B.C., people who lived along the **Nile River** had begun to take advantage of the fertile soil left behind by floods. The river and irrigation systems allowed the Egyptians to grow enough food to support a large population. Around 3000 B.C., Egyptian civilization grew under the rule of Egypt's kings, or **pharaohs**. Believing their pharaohs to be part god, Egyptians built the famous **pyramids** to house these rulers in their next lives. Many who built the pyramids and did the hard work to build this civilization were slaves.

Around the same time, in the **Fertile Crescent**—an area northeast of Egypt—**Sumerian** city-states were also developing irrigation and flood control methods. They also created a system of writing. In about 1800 B.C., the Sumerians were conquered by the Babylonians. One of the Babylonian kings, Hammurabi, is remembered for codifying laws. The **Code of Hammurabi** was written on a huge stone in a public place so all Babylonians could know and follow the law.

The civilization of **ancient Greece** did not develop around a river, but around the sea. The Greeks built an **empire**: they established colonies on the Mediterranean Sea and the Black Sea; then they imported food from the colonies. However, Greece itself was not politically unified. As its city-states fought for control of each other's land, Sparta, a particularly warlike state, took over a number of other city-states. Athens, another city-state, is known as the first political **democracy**. All Athenian citizens could vote—but less than half of Athenians were citizens. Women could not vote; nor could the many slaves. The Greek Empire lasted only a few hundred years, but its original ideas, such as democracy, and its stunning arts, including architecture and literature, remain influential even now.

Eventually the Greek Empire fell to **Roman** conquerors. Rome began as a city on the Italian Peninsula, governed by its wealthy citizens through an elected Senate. Roman law has been very influential in the modern United States. For example, the Romans believed that a person accused of a crime was innocent until proven guilty. The power of Rome grew, and the Romans took over many lands surrounding the Mediterranean Sea, pushing north as far as England and east into Asia by about A.D. 100. Roman leaders built systems and infrastructure to make their empire strong: schools, roads and bridges, hospitals, a tax system, and an army. The ancient Roman Empire lasted until A.D. 476.

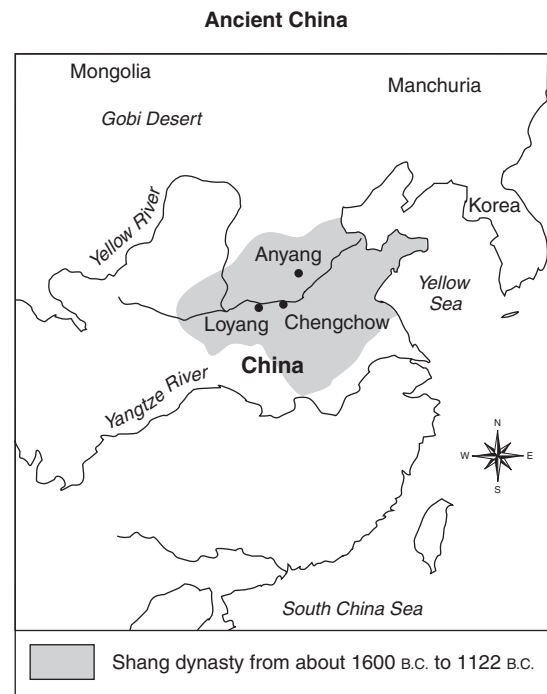
Ancient Egypt, Greece, and Rome were only a few of the early civilizations in which people made important scientific discoveries and developed enduring ideas. In Central America, the **Maya**, whose culture was strongest from A.D. 300 to 900, invented a pictographic writing system in which they recorded remarkable discoveries in mathematics and astronomy. The **Inca Empire** in South America had a sophisticated system of government. The Incas built amazing roads and bridges in their rugged mountain lands. In Mexico, the **Aztecs** invented a written language and a calendar system and expanded their farmlands by dredging mud from lakes.

# WORLD HISTORY ► PRACTICE 1

Choose the one best answer to each question.

- Which of the following Central American civilizations is particularly noted for achievements in mathematics and astronomy?
  - (1) the Egyptians
  - (2) the Sumerians
  - (3) the Maya
  - (4) the Aztecs
  - (5) the Incas
- Which of the following civilizations had systems of government and law that strongly influenced the form of government adopted by the United States?
  - (1) Sumer and ancient Egypt
  - (2) Sumer and Babylonia
  - (3) Babylonia and ancient Greece
  - (4) ancient Greece and ancient Rome
  - (5) ancient Rome and the Incas
- What did the ancient civilizations of Egypt and the Fertile Crescent have in common?
  - (1) Both developed flood control and irrigation technologies to boost food production.
  - (2) Both had a public code of law engraved on a huge stone.
  - (3) Both were centered on the shores of the Mediterranean Sea.
  - (4) Both developed systems of political democracy in which citizens could vote.
  - (5) Both extended their influence throughout Europe as well as the Middle East.
- Once a society developed agriculture and domesticated animals, food surpluses and rising populations made possible which of the following developments?
  - (1) hunting and gathering
  - (2) a nomadic lifestyle
  - (3) towns
  - (4) stone tools
  - (5) stone carvings

Questions 5 and 6 refer to the following map.



- In the Yellow River valley, floods deposit a fertile yellow soil called loess that is easily worked by farmers.

Which of the following civilizations arose under geographic conditions similar to those in ancient China?

  - (1) the Incas
  - (2) the Aztecs
  - (3) ancient Greece
  - (4) ancient Rome
  - (5) ancient Egypt
- Which of the following statements is supported by the information in the map?
  - (1) The Yellow River is the only major river in China.
  - (2) The Shang dynasty, or ruling family, controlled China for almost a thousand years.
  - (3) The Yellow River was probably the main trade route between Loyang and Chengchow.
  - (4) The Shang civilization traded more with Korea than with Manchuria.
  - (5) Later Chinese dynasties located their capital city along the Yangtze River.

Answers and explanations start on page 640.

## WORLD HISTORY

## Feudalism to Nation States

**Key Ideas**

- During the Middle Ages, the feudal system helped to stabilize Europe.
- A by-product of the Crusades was the opening up of trade routes and city growth.
- During the Renaissance, education grew in importance and people left the Catholic Church to establish Protestantism.

**GED TIP**

*To summarize a graph such as the one on page 183, ask yourself: What is the topic of the graph? What is the main point of the data? How could I say this in a sentence or two?*

The **Middle Ages** in Europe lasted from about A.D. 500 to 1500. As the once strong government of Rome weakened, Europe became vulnerable to invasions from warring groups called barbarians. One barbarian ruler named **Charlemagne** conquered most of Europe by 800. Charlemagne was able to stabilize this large territory for a time. He established laws, spread Christianity, and encouraged education and commerce. When Charlemagne died in 814, the territories of Europe became unstable again, and the system of **feudalism** emerged.

Under feudalism, kings granted control of land to nobles. A noble's soldiers, or knights, protected the noble's estate, or manor. **Peasants** farmed at the manor. Nobles paid taxes to kings; peasants paid taxes to nobles. As the political boundaries among the kings' lands became established, the feudal system made life in Europe more peaceful over several hundred years' time.

To the east, the religion of **Islam** was founded during the early Middle Ages by the prophet Muhammad, who was born in A.D. 570. The followers of Islam, called **Muslims**, conquered large territories in the Middle East, northern Africa, Spain, Persia, and India. They established the Muslim Empire. Many people in these conquered lands converted to Islam while contributing their own knowledge and arts to the Muslim culture. Although the Muslim Empire itself did not last, its religion and culture have remained strong.

During the late Middle Ages, Christians and Muslim Turks fought over the holy city of Jerusalem in a series of wars called the **Crusades**. Christians gained control of Jerusalem from the Turks, but they ruled the city for less than 90 years. A more lasting effect of the Crusades was to open up trade between Europe and the Middle East and even China. As trade, money, and merchants grew in importance in Europe, feudalism declined. People left the manors and went to live and work in cities, where opportunities were greater. Cities gained political, economic, and cultural importance.

During the Middle Ages, European nations began to form as **monarchs** combined territories of small rulers and took advantage of the wealth of cities. England's monarchy was established by 1100. France won the Hundred Years' War against England and emerged as a strong nation under its monarch. Spain united through the marriage of two rulers, Ferdinand and Isabella, who had each controlled smaller states.

The **Renaissance**, which spread from Italy across Europe between 1300 and 1600, brought growth in education, science, and the arts. The Renaissance also led to changes in the Catholic Church. During the **Reformation** in the 1500s, reformers criticized the church for abusing its power. Those who believed that people should read the Bible themselves rather than follow the pope split from the Catholic Church and formed the **Protestant** religion. King Henry VIII of England broke from the Catholic Church and formed the Church of England so he would not have to obey the pope.

## WORLD HISTORY ► PRACTICE 2

Choose the one best answer to each question.

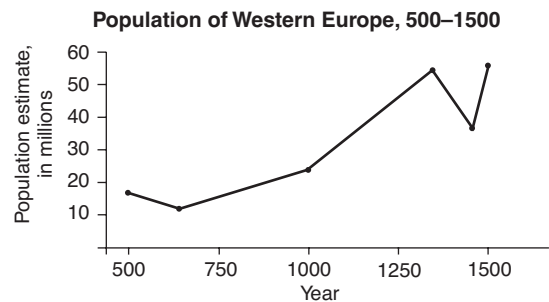
1. What was the role of the knights in feudal Europe?
  - (1) to farm the manor
  - (2) to collect taxes for the king
  - (3) to take care of livestock
  - (4) to protect their noble's land from attack
  - (5) to administer justice
2. In which modern European nation would you expect to find evidence of the arts and culture of the Muslim Empire?
  - (1) Great Britain
  - (2) France
  - (3) Spain
  - (4) Italy
  - (5) Greece
3. During the late Middle Ages, the growth of trade spurred a migration of peasants from the manors to the towns. To which of the following events is this most similar?
  - (1) the migration of Puritans to the New World to escape religious persecution in the 1600s
  - (2) the migration of people from farms to industrial cities in the 1800s
  - (3) the migration of political refugees to the United States in the 1900s
  - (4) the migration of individuals with health problems from cold, damp regions to warm, dry regions
  - (5) the growth of trade with nations along the Pacific Rim in the late 1900s
4. At the time of the Reformation, which of the following was one of the main differences between Roman Catholics and Protestants?
  - (1) Roman Catholics accepted the authority of the pope and Protestants did not.
  - (2) Roman Catholics lived on the manors and Protestants lived in the towns.
  - (3) Roman Catholics supported the monarchies in their nations and Protestants did not.
  - (4) Roman Catholics consolidated their nations from feudal units and Protestants did not.
  - (5) Roman Catholics led the Church of England under Henry VIII and Protestants did not.

5. In England in the 1100s, any free man could bring a case before a royal court headed by a circuit judge, who formed juries of local people. The decisions of these courts were recorded and formed the basis for common law, which was applied to everyone in the kingdom. In contrast, justice in the manor courts, which were run by the nobles, could be fickle. There were few written laws, and the verdicts could be overturned by the lord.

People usually preferred to be tried in royal courts rather than manor courts because the royal courts valued which of the following?

- (1) accepted legal principles
- (2) harsh punishment
- (3) justice for the nobles
- (4) power for the local lord
- (5) fines rather than imprisonment

Question 6 refers to the following graph.



SOURCE: Carlo M. Cipolla, ed. *The Fontana Economic History of Europe: The Middle Ages* and Carlo M. Cipolla *Before the Industrial Revolution: European Society and Economy, 1000–1700*

6. Which of the following best summarizes the information shown on the graph?
  - (1) The population of western Europe almost doubled.
  - (2) The population of western Europe showed the most growth between the years 750 and 1000.
  - (3) There were fewer than 50 million people living in western Europe at any given time.
  - (4) The population of western Europe showed almost constant growth with only brief periods of decline.
  - (5) The population of western Europe fell to its lowest around the year 1450.

Answers and explanations begin on page 640.



## WORLD HISTORY

## Expansion and the Global Age

**Key Ideas**

- European explorers sought new sailing routes to make trading easier with India and Asia.
- European rulers set up colonies in order to extend their territories and gain new wealth.
- Native peoples and cultures were exploited by colonization.

**ON THE GED**

*Some questions will ask, “Which of the following statements is supported by the graph (or the map)?” Read the choices and carefully check each against the graphic.*

Europeans had many reasons for leaving the shores of their own continent. Starting around 1500, explorers from European nations such as Spain and France sailed on risky voyages all over the world. Some were looking for trade routes and valuable goods, such as spices, to bring back. Others were missionaries bent on spreading the Christian religion. Still others were paid by their rulers to find new lands to conquer. No matter what the reasons for their journeys, they faced real dangers and uncertain rewards.

Vasco da Gama, a Portuguese explorer, sailed south around Africa to reach India. His journey took two years, but it was profitable: his four ships returned full of spices. Most Americans know the story of Christopher Columbus, who sailed west, expecting to reach Asia. Instead, he found the **New World**—the Americas. A different Spanish explorer, Magellan, led the first around-the-world expedition. In 1519, Magellan and his crew left Spain to sail around the southern tip of South America en route to India. Of Magellan’s five ships, only one made it back to Spain; Magellan himself died in the Pacific. Not long after, a French explorer, Jacques Cartier, tried and failed to find a river route through North America to the Pacific. These explorers greatly expanded the Europeans’ knowledge of geography.

European rulers turned to distant lands to expand their own power and resources, primarily for economic gain. **Colonies** offered a number of advantages to their ruling nations. Colonies could be required to **import** goods only from the ruling nation, and they could be forced to **export** their products and natural resources only to the ruling nation. Furthermore, anything in the colonized area was considered the property of the ruling nation. In the 1500s, Spain gained great wealth from its colonies in the New World by stealing valuable objects from the native civilizations and by mining and removing gold, silver, and other minerals from their lands. Colonialism could be utterly devastating to native cultures, economies, and populations, as colonizers brought not only weapons but also deadly diseases.

Historians distinguish among different types of colonies, depending on the relationship between the ruling nation and the particular colony. In colonies of **settlement**, people from the ruling nation migrated to the colony and established a government under the authority of the ruling nation. The English colonies in North America were colonies of settlement. Although American Indians had long-established societies and territories of their own, these were irrelevant to the English settlers. From the point of view of the British government, the lands belonged to England, and the American Indians were subject to British law and had to obey the British colonial government.

Colonies of **exploitation** were common in tropical climates, where Europeans did not want to establish their own settlements. In these colonies, the ruling nation established a government to exploit the local labor force and natural resources. Although the native people were forced to produce goods and crops to benefit the ruling nation, their own populations and cultures were not usually wiped out.

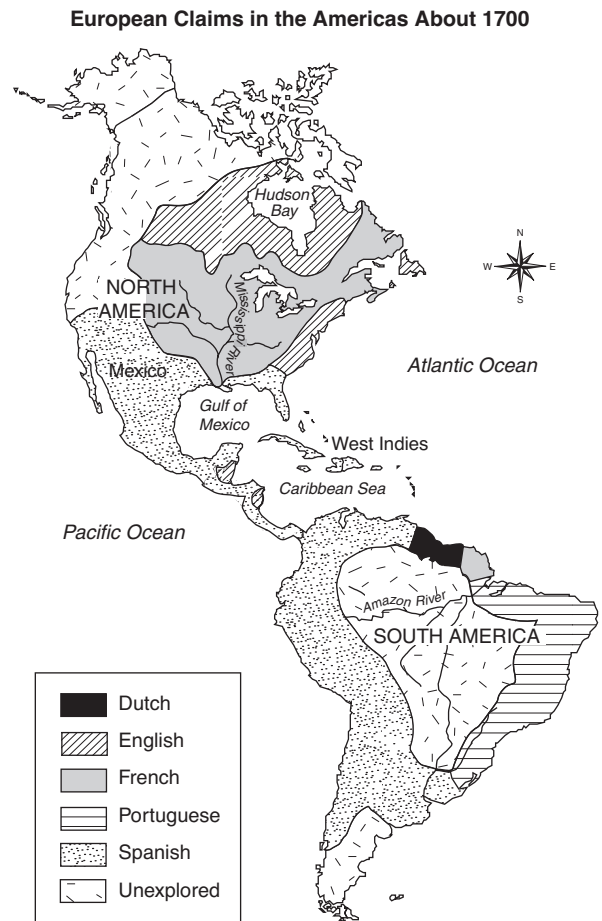


## WORLD HISTORY ► PRACTICE 3

Choose the one best answer to each question.

- For what is Magellan best known?
  - discovering a route north of North America to the Pacific Ocean
  - discovering a route to India around the southern tip of Africa
  - being the first European to see the Indian Ocean
  - exploring North America's rivers
  - leading the first around-the-world expedition
- According to the passage, what is the main reason European rulers explored the New World and established colonies?
  - to convert people to Christianity
  - to establish democratic governments
  - to gain economic benefits
  - to find a river route through North America
  - to learn how people in distant lands lived
- Which of the following is an example of a colony of exploitation?
  - Pennsylvania, where Quakers and other religious minorities settled to escape religious persecution in Europe
  - Malaya, where the British set up and ran rubber plantations worked by the native peoples
  - the island of Manhattan and areas north along the Hudson River, where the Dutch established the settlement of New Netherlands
  - Iceland, which was settled by the Norse and came under the rule of Norway and later under the rule of Denmark
  - Brazil, where the King of Portugal gave large parcels of land to loyal subjects, who enlisted others to settle on the land
- Based on the passage, what was the main cause of population decline among native colonized peoples?
  - emigration to the colonizing nations
  - emigration to other colonies
  - slavery
  - war and disease
  - low birthrate

Question 5 refers to the following map.



- Which of the following statements is supported by information on the map?
  - In 1700, most of the Amazon River valley was claimed by Portugal.
  - The Dutch had the smallest claim in the Americas in 1700.
  - By 1700, the English had claimed the west coast of North America.
  - In 1700, Mexico was claimed by both the Portuguese and the Spanish.
  - By 1700, the pope had divided South America between the Spanish and the Portuguese.

Answers and explanations begin on page 641.

## WORLD HISTORY

## The Age of Revolutions

**Key Ideas**

- In the American and French Revolutions, people fought against unjust governments.
- Revolution spread to Latin America, ending many colonial governments there.
- The Industrial Revolution caused sweeping changes in work, living conditions, and social mobility.

**ON THE GED**

*As part of the GED Social Studies test, you may be provided with basic historic information and asked to make comparisons—such as the similarities and differences between two revolutions.*

Political revolutions often happen when people are unhappy about the conditions resulting from their system of government. Political revolutions may also be fueled by new ideas about who is best suited to govern. In the Age of Revolutions, many people wanted more political power.

One important cause of the **American Revolution** was British taxation. Although British citizens in England were represented in government through **Parliament**, the American colonists did not have representatives in that body. The colonists believed that they should not have to pay the special taxes levied on them, since they had had no voice in determining the tax laws. Although the colonists began by arguing for representation in the British government, by 1776, they declared themselves a sovereign nation, the United States of America.

Revolutionaries in France were inspired by democratic ideas expressed in the American colonies' **Declaration of Independence** and the **U.S. Constitution**. Unlike England, France had no Parliament; the French monarch had absolute power. The nobility and the Church had many privileges and paid no taxes, while ordinary citizens paid heavy taxes and had few rights or freedoms. In 1789, the French people organized a National Assembly—a law-making body to represent them. When King Louis XVI fought against the establishment of the National Assembly, the **French Revolution** began. Its turmoil lasted for ten years.

In Latin America, many colonized people, inspired in part by the American and French Revolutions, began to shake off European rule. In Haiti, an island in the Caribbean Sea, slaves led by Toussaint L'Ouverture overturned French rule and established an independent nation in 1804. Mexican revolutionaries finally won their independence from Spain in 1821. In South America, revolutions rocked the continent until 1824, by which time most countries had gained their independence.

Important revolutions are not always political. The **Industrial Revolution** started in the late 1700s in the textile industry, when new equipment was invented for spinning thread and weaving cloth. Instead of workers using their own tools at home, factories could house many workers using machines to produce much greater quantities. This factory model for large-scale production spread along with **steam engines** and electricity. Workers moved into factory towns and cities to work for wages. The Industrial Revolution brought a mixture of benefits and problems—useful inventions, increasing wealth, and new **social mobility** were offset by dangerous factory jobs, **child labor**, crowded cities, and **pollution**.

The Industrial Revolution also brought sweeping social changes. The economic mainstay of the European **aristocracy** had been farmland. After the Industrial Revolution, manufacturing and trade became more important economically than agriculture. Thus, the merchant classes became more powerful. New ideas about political equality affected how people thought about social equality as well.

## WORLD HISTORY ► PRACTICE 4

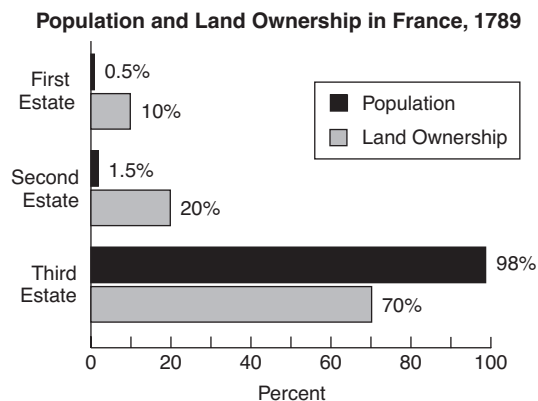
Choose the one best answer to each question.

1. Which of the following had a great influence on the French Revolution?

- (1) the Industrial Revolution
- (2) the Mexican Revolution
- (3) the U.S. Declaration of Independence
- (4) the British monarchy
- (5) Toussaint L'Ouverture's revolution in Haiti

Question 2 refers to the following paragraph and graph.

Before the French Revolution, the French were divided into three groups by law, each with different privileges. In the First Estate were the higher clergy, who were nobles, and the parish priests, who were commoners. The Second Estate consisted of nobles who were not members of the clergy. The Third Estate was made up of commoners, including the middle class and peasants.



2. Which of the following statements is supported by the paragraph and the graph?

- (1) The First Estate made up most of the population.
- (2) All members of the nobility belonged to the First Estate.
- (3) The members of the First Estate owned more property than members of the Second Estate.
- (4) The distribution of wealth in prerevolutionary France favored the Third Estate.
- (5) Members of the Third Estate owned the least amount of land per person.

3. According to the passage on page 186, what was a main difference between the English and French governments before 1789?

- (1) England had a Parliament, and France did not.
- (2) England had a monarchy, and France did not.
- (3) England had a class called the nobles, and France did not.
- (4) England levied taxes, and France did not.
- (5) England had colonies, and France did not.

4. On what was the economic power of the aristocracy based in eighteenth-century Europe?

- (1) moral superiority
- (2) attaining a high level of education
- (3) possessing large landholdings
- (4) belonging to the Church bureaucracy
- (5) personal acquaintance with the king

5. Which of the following does the writer of the passage take for granted that you know, and so does not state outright?

- (1) The American colonists demanded representation in the British government before they declared independence.
- (2) A sovereign nation is independent, having the power to control itself.
- (3) Many colonies were influenced by the American and French revolutions to seek independence.
- (4) The Industrial Revolution brought sweeping social changes.
- (5) As manufacturing and trade became more important, the merchant classes gained power.

6. The Information Revolution of the late twentieth century, spurred by the availability of personal computers and the Internet, is most similar to which of the following revolutions?

- (1) the American Revolution
- (2) the French Revolution
- (3) the revolution for Haitian independence
- (4) the Mexican Revolution
- (5) the Industrial Revolution

Answers and explanations start on page 641.

## WORLD HISTORY

## The Twentieth Century

**Key Ideas**

- Two devastating world wars occurred during the first half of the twentieth century.
- The United States and Soviet Union emerged as superpowers after World War II.
- The superpowers faced off during the Cold War, which ended with the breakup of the Soviet Union in 1991.

**GED TIP**

*You may be familiar with some of the world events covered on the GED. However, answer questions based on the information provided on the test, even if it differs from what you remember.*

World War I resulted from **nationalism** and **imperialism**—the desire of nations to extend their empires. This desire for expansion led to military buildup. When war broke out in 1914 between Serbia and Austria-Hungary over the assassination of an Austrian leader visiting Serbia, a chain reaction started as other countries also declared war. Germany and Austria-Hungary were the mainstays of the **Central Powers**, who fought against the **Allies**—England, France, Russia, Serbia, and eventually the United States. When the Central Powers finally lost the war, millions of people had been killed. The war had devastated Europe, leaving many people jobless and homeless. In the 1918 **Treaty of Versailles**, Germany was blamed for the war and forced to pay **reparations** to the Allies.

Revolution in Russia began during World War I. The Russian **Czar** refused to pull out of the war, even though most Russians did not support involvement. In 1917, the Czar and his family were assassinated, and the **Russian Revolution** ended with Bolshevik leader Vladimir Lenin in power. The Bolsheviks founded the Soviet Union as a **communist** nation with one political party—the Communist Party.

The Great Depression, which began in the United States when the stock market crashed in 1929, affected many countries. One hard-hit nation was Germany, which was still suffering economically and politically from its defeat in World War I. By 1933, nearly half of German workers were unemployed, and people were starving. Adolf Hitler, leader of the Nazi Party, rose to power by appealing to German nationalism and promising to put people back to work. Hitler's terrible form of nationalism involved imprisoning and killing people who were not part of "the Aryan race." Jews were the main targets of Hitler's campaign, now called the **Holocaust**. Hitler wanted to take over all Europe, and because other powerful nations wanted to avoid war, they let him annex Austria, then Czechoslovakia. But when Hitler invaded Poland in 1939, England and France declared war on Germany, and **World War II** began. Many nations went to war, including the United States. Once again, Germany and the other **Axis Powers** (including Italy and Japan) were defeated by the Allies. The United States dropped the first **atomic bomb** on Hiroshima to end the war.

After World War II, the United States and the Soviet Union emerged as **superpowers**. Former allies, they each led opposing groups of countries, one group democratic, the other group communist. The two groups of nations so distrusted each other that the period following World War II was called the **Cold War**—a war fought through political and diplomatic contests instead of battles. To catch up with the United States, the Soviet Union started to build its own nuclear weapons, and the **arms race** began, soon followed by the "space race."

However, by 1990 the Soviet bloc was falling apart. The Soviet Union itself split into 15 countries in 1991. People who had lived under repressive governments for many years struggled to establish democracy—not only in the former Soviet bloc, but also in Africa, Latin America, and Asia.

## WORLD HISTORY ► PRACTICE 5

Choose the one best answer to each question.

- As a result of the 1918 Treaty of Versailles, what did Germany have to do?
  - pay the Allies money to repair war damages
  - develop its military forces to protect Europe
  - adopt a communist government
  - promote nationalism among its people
  - replace Hitler with a freely elected leader
- What event was the immediate cause of England and France declaring war on Germany at the beginning of World War II?
  - the killing of non-Aryan people
  - the annexation of Austria
  - the annexation of Czechoslovakia
  - the invasion of Poland
  - the invasion of France
- Before the atomic bomb was dropped on Hiroshima, the Allies warned Japan they would suffer “complete and utter destruction” unless they surrendered. Despite the fact that 80,000 people were killed and 40,000 wounded by the bombing of Hiroshima, Japan still refused to surrender. The United States then dropped a second atomic bomb on the city of Nagasaki, killing 40,000 more people. After the second bombing, the Japanese surrendered.

Japan’s refusal to surrender after the bombing of Hiroshima suggests that the Japanese placed a high value on which of the following?

  - technological innovation
  - independence
  - national pride
  - the lives of military personnel
  - a lasting peace
- Which of the following is a similarity between World War I and World War II?
  - Both were started by Germany.
  - Both were confined to Europe.
  - Both occurred after the Russian Revolution.
  - Both involved the use of atomic weapons.
  - Both were won by the Allies.

Questions 5 and 6 refer to the following chart.

**Casualties in World War II**

Nation	Military Dead	Military Wounded	Civilian Dead
Great Britain	398,000	475,000	65,000
Soviet Union	7,500,000	14,102,000	15,000,000
United States	292,000	671,000	very few
Germany	2,850,000	7,250,000	5,000,000
Japan	1,576,000	500,000	300,000

SOURCE: *The Second World War* by Henri Michel

- What was the main difference between the casualties sustained by the United States and those sustained by other nations in World War II?
  - The United States had more military dead than wounded.
  - The United States sustained only a few civilian casualties.
  - The United States had the fewest wounded.
  - The United States had more civilian than military casualties.
  - The United States had few military dead.
- The main reason that the Soviet Union had so many casualties is that it was invaded by the German army, which got as far as the outskirts of Moscow and Leningrad. There the Germans halted in 1941. Severe winters, long supply lines back to Germany, and stiff resistance from the Soviets ultimately defeated the Germans.

Which of the following events is most similar to the German invasion of the Soviet Union?

  - the 1812 French invasion of Russia, which failed due to harsh weather and lack of supplies
  - the occupation of Singapore by Japan in World War II, which gave Japan control of Malaya
  - the 1941 Japanese attack on Pearl Harbor, which drew the United States into World War II
  - the 1945 Allied invasion of Europe, which liberated Europe from German control
  - the 1950 attack by North Korean forces on South Korea, which started the Korean War

**Answers and explanations start on page 641.**







## DECIMALS AND FRACTIONS ► PRACTICE 4.1

A. Solve. Reduce answers to lowest terms. Simplify improper fractions as mixed numbers.

1. 
$$\begin{array}{r} \frac{3}{8} \\ + \frac{1}{8} \\ \hline \end{array}$$

3. 
$$\begin{array}{r} \frac{8}{9} \\ - \frac{5}{9} \\ \hline \end{array}$$

5. 
$$\begin{array}{r} \frac{1}{4} \\ + \frac{2}{3} \\ \hline \end{array}$$

7. 
$$\begin{array}{r} \frac{9}{10} \\ - \frac{3}{5} \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 2\frac{1}{5} \\ + 1\frac{2}{3} \\ \hline \end{array}$$

2. 
$$\begin{array}{r} \frac{1}{6} \\ + \frac{5}{6} \\ \hline \end{array}$$

4. 
$$\begin{array}{r} \frac{7}{12} \\ - \frac{5}{12} \\ \hline \end{array}$$

6. 
$$\begin{array}{r} \frac{1}{2} \\ + \frac{5}{8} \\ \hline \end{array}$$

8. 
$$\begin{array}{r} \frac{7}{9} \\ - \frac{1}{2} \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 4\frac{1}{2} \\ - 2\frac{3}{4} \\ \hline \end{array}$$

11.  $5\frac{5}{6} + 2\frac{2}{3} =$

12.  $6\frac{7}{8} + 4\frac{3}{4} =$

13.  $12\frac{1}{10} + 9\frac{3}{5} =$

14.  $2\frac{2}{9} + \frac{2}{3} + 4\frac{5}{6} =$

15.  $3\frac{1}{3} + 5\frac{2}{5} + 3\frac{5}{6} =$

16.  $\frac{3}{8} + \frac{7}{12} + 1\frac{2}{3} =$

17.  $16\frac{2}{3} + 25\frac{3}{4} =$

18.  $10\frac{1}{2} + 8\frac{4}{5} + 3\frac{1}{4} =$

19.  $8\frac{1}{2} - 3\frac{4}{9} =$

20.  $15 - 3\frac{7}{8} =$

21.  $14\frac{1}{4} - 10\frac{3}{7} =$

22.  $9\frac{11}{12} - 8\frac{5}{8} =$

23.  $6 - 3\frac{4}{7} =$

24.  $13\frac{1}{3} - 4\frac{4}{9} =$

25.  $5\frac{5}{7} - 4\frac{4}{5} =$

B. Choose the one best answer to each question.

26. To make the top of a dining room table, Craig glues a piece of oak that is  $\frac{5}{16}$  inch thick to a piece of pine that is  $\frac{7}{8}$  inch thick. What is the total thickness, in inches, of the tabletop?

(1)  $\frac{1}{2}$

(2)  $\frac{9}{16}$

(3)  $1\frac{3}{16}$

(4)  $1\frac{1}{4}$

(5)  $1\frac{9}{16}$

28. At a fabric store, Melissa sold  $8\frac{7}{8}$  yards of cloth to a customer. If the material was cut from a bolt of fabric containing  $23\frac{1}{4}$  yards, how many yards are left on the bolt?

(1)  $14\frac{3}{8}$

(2)  $15\frac{1}{4}$

(3)  $15\frac{3}{8}$

(4)  $15\frac{3}{4}$

(5)  $31\frac{7}{8}$

27. Carol will use the two bolts shown below to assemble a book cart. How much longer, in inches, is bolt A than bolt B?



(1)  $\frac{5}{8}$

(2)  $1\frac{3}{8}$

(3)  $1\frac{5}{8}$

(4)  $1\frac{3}{4}$

(5)  $2\frac{1}{2}$

29. A batch of salad dressing requires  $1\frac{2}{3}$  cups of olive oil,  $\frac{1}{2}$  cup of vinegar, and  $\frac{3}{4}$  cup of water. How many cups of salad dressing will this recipe produce?

(1)  $1\frac{2}{3}$

(2)  $1\frac{5}{6}$

(3)  $2\frac{5}{6}$

(4)  $2\frac{11}{12}$

(5)  $3\frac{7}{12}$

Answers and explanations begin on page 666.

## Multiplication and Division

It isn't necessary to find a common denominator to multiply and divide fractions. To multiply fractions, simply multiply the numerators and then the denominators. Reduce the answer, if necessary.

**Example 1:** What is the product of  $\frac{7}{8}$  and  $\frac{1}{2}$ ?

Multiply the numerators together, and then the denominators. The answer is in lowest terms.

$$\frac{7}{8} \times \frac{1}{2} = \frac{7 \times 1}{8 \times 2} = \frac{7}{16}$$

Before multiplying a mixed number, change it to an improper fraction.

**Example 2:** What is  $\frac{1}{3}$  of  $3\frac{3}{4}$ ?

1. Change  $3\frac{3}{4}$  to an improper fraction.
2. Multiply the numerators and the denominators.
3. Change to a mixed number and reduce to lowest terms.

$$3\frac{3}{4} = \frac{15}{4}$$

$$\frac{15}{4} \times \frac{1}{3} = \frac{15 \times 1}{4 \times 3} = \frac{15}{12}$$

$$\frac{15}{12} = 1\frac{3}{12} = \mathbf{1\frac{1}{4}}$$

You can use a shortcut called **canceling** to reduce the fractions as you work the problem. To cancel, divide both a numerator and a denominator by the same number. The numerator and the denominator can be in different fractions.

**Example 3:** Multiply  $1\frac{1}{2}$  by  $1\frac{1}{5}$ .

1. Change to improper fractions.
2. Set up the multiplication problem. Both 6 (a numerator) and 2 (a denominator) are evenly divisible by 2. Divide them by 2. Then multiply using the new numerator and denominator. Finally, change the improper fraction to a mixed number.

$$1\frac{1}{2} = \frac{3}{2} \text{ and } 1\frac{1}{5} = \frac{6}{5}$$

$$\frac{3}{2} \times \frac{6}{5} = \frac{3}{2} \times \frac{\overset{3}{\cancel{6}}}{5} = \frac{9}{5} = \mathbf{1\frac{4}{5}}$$

The slash marks show that the numbers have been divided.

You will need one additional step to divide fractions. Before dividing, **invert** the divisor (the fraction you are dividing by). To invert the fraction, switch the numerator and the denominator. Finally, change the division symbol to a multiplication symbol and multiply.

**Example 4:** Jim has an 8-pound bag of nuts. He wants to fill smaller,  $\frac{1}{2}$ -pound bags using the nuts. How many small bags can he make?

1. Divide 8 by  $\frac{1}{2}$ . Set up the division problem. Always write whole or mixed numbers as improper fractions.
2. Invert the fraction you are dividing by, and change the operation sign to multiplication. Multiply, following the rules for multiplying fractions. **Jim can make 16 small bags.**

$$8 \div \frac{1}{2} = \frac{8}{1} \div \frac{1}{2} =$$

$$\frac{8}{1} \times \frac{2}{1} = \frac{16}{1} = \mathbf{16}$$

**Note:** When you multiply by a fraction, the answer is smaller than the number you started with because you are finding a "part of." When you divide by a fraction, the answer is greater than the number.

## DECIMALS AND FRACTIONS ► PRACTICE 4.2

A. Solve. Reduce answers to lowest terms. Simplify improper fractions as mixed numbers.

1.  $\frac{2}{3} \times \frac{1}{4} =$

7.  $2\frac{1}{3} \times 3\frac{2}{5} =$

13.  $6 \div 2\frac{1}{2} =$

2.  $1\frac{5}{6} \times \frac{1}{2} =$

8.  $15 \times 2\frac{3}{4} =$

14.  $3\frac{3}{4} \div 1\frac{2}{3} =$

3.  $\frac{2}{3} \times 21 =$

9.  $\frac{5}{8} \times 3\frac{1}{4} =$

15.  $9 \div \frac{1}{3} =$

4.  $50 \times \frac{3}{8} =$

10.  $\frac{7}{8} \div \frac{1}{16} =$

16.  $26\frac{2}{3} \div 3\frac{1}{3} =$

5.  $3\frac{1}{2} \times \frac{1}{4} =$

11.  $\frac{4}{5} \div \frac{4}{9} =$

17.  $40\frac{3}{8} \div 4\frac{1}{4} =$

6.  $\frac{3}{4} \times 2\frac{7}{8} =$

12.  $12 \div \frac{1}{4} =$

18.  $3\frac{7}{8} \div 5\frac{1}{6} =$

B. Choose the **one best answer** to each question.

19. A city is considering raising taxes to build a football stadium. A survey of registered voters yielded the following results:

Position	Fraction of Those Surveyed
Against Tax Hike	$\frac{7}{16}$
For Tax Hike	$\frac{3}{16}$
Undecided	$\frac{3}{8}$

If 400 people were surveyed, how many support the tax hike?

- (1) 25  
(2) 48  
(3) 75  
(4) 133  
(5) 150

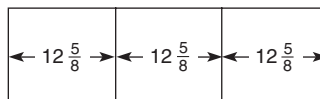
20. A tailor has 20 yards of shirt fabric. How many shirts can she **complete** if each shirt requires  $2\frac{3}{4}$  yards of fabric?

- (1) 6  
(2) 7  
(3) 8  
(4) 10  
(5) 14

21. An insurance agent estimates that it takes  $\frac{2}{3}$  hour to process a customer's claim. If the agent spends 22 hours per week processing claims, about how many claims does he process in a week?

- (1)  $14\frac{2}{3}$   
(2) 26  
(3) 33  
(4) 44  
(5) 66

22. A fluorescent lighting panel is  $12\frac{5}{8}$  inches wide. If three of the panels are installed as shown below, what will be the width in inches of the combined panels?



- (1)  $4\frac{5}{24}$   
(2)  $13\frac{7}{8}$   
(3)  $36\frac{5}{8}$   
(4)  $37\frac{7}{8}$   
(5)  $42\frac{7}{8}$

Answers and explanations begin on page 666.

## DECIMALS AND FRACTIONS

Solving Problems  
Using a Calculator

## Key Ideas

- Fraction and decimal operations are entered in the same order as whole number operations.
- Calculators display remainders in decimal form.
- Many scientific calculators show the parts of the fraction separated by the  $\downarrow$  symbol.

## GED TIP

Practice using the fraction keys if you have them on your calculator. These keys will save you time on the GED Math Test by eliminating the need to find a common denominator or to reduce answers to lowest terms.

## Decimals and Fractions on the Calculator

You can solve both decimal and fraction problems using a scientific calculator. Decimal operations are performed in the same way that you have learned to enter operations with whole numbers. Study the following examples.

To solve this problem:	Press these keys:	The display reads:
$3.89 + 2.5$	$3.89 \boxed{+} 2.5 \boxed{=}$	6.39
$5.2 - 0.78$	$5.2 \boxed{-} .78 \boxed{=}$	4.42
$0.9 \times 15$	$.9 \boxed{\times} 15 \boxed{=}$	13.5
$1.7 \div 2$	$1.7 \boxed{\div} 2 \boxed{=}$	0.85

When you divide using a calculator, any remainder is expressed as a decimal.

**Example 1:** For her students, Monica buys 144 heart-shaped erasers for \$8.85. To the nearest cent, what is the cost of each eraser?

1. Divide \$8.85 by 144.  
Press:  $8.85 \boxed{\div} 144 \boxed{=}$   
Display:  $0.061458333$
2. Round the answer to the hundredths place to express the answer in cents.  
 $0.061458333$  rounds to **\$0.06**.

Although not all scientific calculators will perform operations with fractions, the *Casio fx-260* scientific calculator that you will use when you take the GED Math Test can. To enter a fraction, enter the numerator, press  $\boxed{a^b/c}$ , and enter the denominator. If you press  $\boxed{=}$ , the calculator will reduce the fraction to lowest terms.

**Example 2:** Reduce  $\frac{56}{448}$  to lowest terms.

Press these keys:  $56 \boxed{a^b/c} 448 \boxed{=}$

The display reads:  $1 \downarrow 8$ .

The  $\downarrow$  symbol separates the numerator and denominator in the answer. Therefore,  $\frac{56}{448}$  reduces to  $\frac{1}{8}$ .

To show a mixed number, the calculator uses the  $\downarrow$  symbol twice. The mixed number  $3\frac{1}{2}$  would be displayed as  $3 \downarrow 1 \downarrow 2$

**Example 2:** Find the sum of  $1\frac{7}{8}$  and  $3\frac{1}{2}$ .

Press these keys:  $1 \boxed{a^b/c} 7 \boxed{a^b/c} 8 \boxed{+} 3 \boxed{a^b/c} 1 \boxed{a^b/c} 2 \boxed{=}$

The display reads:  $5 \downarrow 3 \downarrow 8$ .

Written as a mixed number, the correct answer is  $5\frac{3}{8}$ .

## DECIMALS AND FRACTIONS ► PRACTICE 5

A. Solve the following problems using your calculator.

- $3.5 + 1.87 + 2.009 =$
- $3\frac{2}{3} - 1\frac{5}{12} =$
- $\$25.34 \times 15 =$
- $10\frac{1}{2} \div \frac{1}{4} =$
- Linda earns \$95 per day. If she works  $\frac{8}{9}$  of a day, how much will she earn?
- Aaron bought a refrigerator for \$956.88. The price includes tax and interest charges. If he makes 12 equal monthly payments, how much will he pay each month?
- A plastic pipe that is  $20\frac{5}{8}$  feet long is to be cut into pieces measuring  $1\frac{3}{8}$  feet. How many pieces can be cut from the longer pipe?
- An insurance agent estimates the annual cost of insurance on a home by multiplying the sale price of the home by 0.0125. What will be the yearly cost of insurance on a home priced at \$118,000?
- In a recipe, the total liquid added to a mixture is  $1\frac{1}{2}$  cups of water and  $2\frac{3}{4}$  cups of chicken broth. How many cups of liquid are used in the recipe?

B. Choose the one best answer to each question. You MAY use your calculator.

Questions 10 and 11 refer to the following information.

### Ordering Information—Bedspreads

Size	Weight (pounds)	Price
Twin	4.13	\$49.99
Full	4.81	\$69.99
Queen	5.56	\$84.99
King	6.88	\$94.99

- Karen estimates that she spends  $\frac{1}{3}$  of her take-home pay on rent and  $\frac{1}{4}$  on food. What fraction of her take-home pay is left after these expenses?
  - $\frac{3}{4}$
  - $\frac{5}{7}$
  - $\frac{2}{3}$
  - $\frac{7}{12}$
  - $\frac{5}{12}$
- Silas buys a total of three quilts: two twin-sized quilts and one king-sized quilt. What is the total cost of his purchase?
  - \$99.98
  - \$144.98
  - \$189.98
  - \$194.97
  - \$239.97
- The shipping charge for an order is \$1.20 per pound. To the nearest cent, what would be the shipping charge on a queen-sized quilt?
  - \$4.96
  - \$5.56
  - \$6.67
  - \$8.26
  - \$10.20
- A state park contains 64 acres. The state legislature recently set aside  $\frac{3}{8}$  of the park as a wildlife preserve. How many acres will be set aside for wildlife?
  - 8
  - 21
  - 24
  - 27
  - 38

Answers and explanations begin on page 666.

## DECIMALS AND FRACTIONS

# Filling in the Answer Grid

### Key Ideas

- Write your answer in the top row of boxes; then fill in the grid.
- Always write mixed numbers as improper fractions.

### GED TIP

Double-check your work to make sure that you have filled in only one circle in each column. The fraction bar (slash) or decimal point cannot be marked in the same column as a number.

### Working with Alternative Format Questions

Some of the questions on the GED Math Test are not multiple-choice questions. Instead, you must solve the problem and record the answer by filling in a grid.

In the examples below, you will see how to enter decimals and fractions on the grid. Remember, you should write your answer in the top row of boxes, but this part of the grid will not be scored. You must correctly fill the circles in the grid to receive credit for your answer.

**Example 1:** John needs  $\frac{3}{4}$  cup of brown sugar for a recipe. If he wants to make only one-half the number of servings, how many cups of brown sugar will he need?

1. Multiply to find the answer.  $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$  cup
2. Enter the fraction on the grid. Fill in a slash to represent the fraction bar.

	3	/	8	
	/	●	/	
·	·	·	·	·
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	●	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	●	8
9	9	9	9	9

You may not enter mixed numbers on the grid. If the answer to a problem is a mixed number, change the mixed number to an improper fraction.

**Example 2:** Elaine exercised for  $1\frac{3}{4}$  hours on Monday and  $1\frac{1}{2}$  hours on Tuesday. How many hours did she exercise in all?

1. Add.  $1\frac{3}{4} + 1\frac{1}{2} = 1\frac{3}{4} + 1\frac{2}{4} = 2\frac{5}{4} = 3\frac{1}{4}$  hr
2. Change the answer to an improper fraction.  
 $3\frac{1}{4} = \frac{13}{4}$  Enter the answer on the grid.

1	3	/	4	
	/	●	/	
·	·	·	·	·
0	0	0	0	0
●	1	1	1	1
2	2	2	2	2
3	●	3	3	3
4	4	4	●	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

To enter a decimal, fill in a circle on the third row of the grid to show the location of the decimal point.



## DECIMALS AND FRACTIONS

## Problem Solving: Fraction and Decimal Equivalencies

**Key Ideas**

- To change a fraction to a decimal, divide the numerator by the denominator.
- To change a decimal to a fraction, write the number without the decimal point over the place value of the last decimal digit. Reduce.
- Avoid time-consuming calculations by using fraction-decimal equivalents.

**GED TIP**

Look at the answer choices before you begin working a problem. Knowing whether you need an answer in fraction or decimal form may affect how you approach the problem.

**Use Fraction and Decimal Equivalents**

Fractions and decimals are two ways to show part of a whole. You can change fractions to decimals by dividing.

**Example 1:** Change  $\frac{3}{8}$  to a decimal.

The fraction  $\frac{3}{8}$  means  $3 \div 8$ . Use a calculator to divide.  $3 \div 8 = 0.375$

You can also change a decimal to a fraction.

**Example 2:** Change 0.35 to a fraction.

Write the decimal number over the place value name of the last decimal digit on the right. The last digit, 5, is in the hundredths column. Reduce to lowest terms.  $\frac{35}{100} = \frac{35 \div 5}{100 \div 5} = \frac{7}{20}$

You will find it useful to memorize the most common fraction and decimal equivalents. These equivalents will also help you solve percent problems.

Decimal	Fraction	Decimal	Fraction	Decimal	Fraction
0.1	$\frac{1}{10}$	0.375	$\frac{3}{8}$	0.7	$\frac{7}{10}$
0.125	$\frac{1}{8}$	0.4	$\frac{2}{5}$	0.75	$\frac{3}{4}$
0.2	$\frac{1}{5}$	0.5	$\frac{1}{2}$	0.8	$\frac{4}{5}$
0.25	$\frac{1}{4}$	0.6	$\frac{3}{5}$	0.875	$\frac{7}{8}$
0.3	$\frac{3}{10}$	0.625	$\frac{5}{8}$	0.9	$\frac{9}{10}$
0.333	$\frac{1}{3}$	0.666	$\frac{2}{3}$		

The decimal equivalents for  $\frac{1}{3}$  and  $\frac{2}{3}$  are marked with a bar. The bar shows that the decimal repeats indefinitely.

You can use fraction and decimal equivalents to save time when solving math problems.

**Example 3:** Each dose of cough medicine contains 0.25 ounce of medication. How many ounces of medication are in 48 doses?

To solve the problem, you need to multiply 48 by 0.25,  $48 \times \frac{1}{4} = \frac{48}{4} = 12$  a time-consuming calculation. However, since  $0.25 = \frac{1}{4}$ , you can find  $\frac{1}{4}$  of 48 to solve the problem. The answer is **12 doses**.

Knowing fraction-decimal equivalents can also help you interpret remainders when using a calculator.

**Example 4:** Ray inspects machine assemblies. He must inspect 12 assemblies during his 40-hour workweek. On average, how many hours can he spend on each inspection?

Using a calculator, divide 40 by 12:  $40 \div 12 = 3.33333333$

Since you know that  $0.33\bar{3} = \frac{1}{3}$ , the answer is  $3\frac{1}{3}$  hours.

---

## DECIMALS AND FRACTIONS ► PRACTICE 7

**Solve.** When possible, use fraction and decimal equivalents to make the work easier. You **MAY** use a calculator on questions 5 and 6.

1. During a 25%-off sale, store clerks find the amount of the discounts by multiplying the regular price by 0.25. What is the discount on an item with a regular price of \$80?

- (1) \$32.00
- (2) \$20.00
- (3) \$16.40
- (4) \$3.20
- (5) \$2.00

2. At Linton Products,  $\frac{3}{10}$  of the workers are in the company's ride-share program. If there are 480 workers, which of the following expressions could be used to find the number in the ride-share program?

- (1)  $480 \times 0.7$
- (2)  $480 \div 0.7$
- (3)  $480 \times 0.4$
- (4)  $480 \times 0.3$
- (5)  $480 \div 0.3$

3. Sharon is using a calculator to find out how many hours she has spent on a certain job. She divides, and her display reads:

4.66666666

Assuming her calculations are correct, how many hours did she spend on the job?

- (1)  $4\frac{1}{6}$
- (2)  $4\frac{2}{3}$
- (3)  $4\frac{6}{7}$
- (4) 46
- (5) 466

4. A gourmet candy company charges the following prices per pound.

Jelly Beans	\$9.60
Peanut Brittle	\$12.00
Almond Toffee	\$28.50

How much would a customer pay for 1.5 pounds of peanut brittle?

- (1) \$6.00
- (2) \$9.00
- (3) \$14.40
- (4) \$18.00
- (5) \$42.75

5. At 1 P.M., the amount of rain in a rain gauge is 1.125 inches. At 3 P.M., the gauge holds 1.875 inches. What fraction of an inch of rain fell between 1 P.M. and 3 P.M.?

- (1)  $\frac{7}{8}$
- (2)  $\frac{3}{4}$
- (3)  $\frac{7}{10}$
- (4)  $\frac{1}{8}$

(5) Not enough information is given.

6. A steel rod, 3 meters in length, is cut into 8 equal pieces. What is the length in meters of each piece?

- (1) 0.125
- (2) 0.333
- (3) 0.375
- (4) 2.333
- (5) 2.667

**Answers and explanations begin on page 667.**