

# 10 Virginia SOL

GRADE  
**8**  
MATH

## PRACTICE TESTS

Standards Aligned Problem Solving  
For Comprehensive Assessment Programs

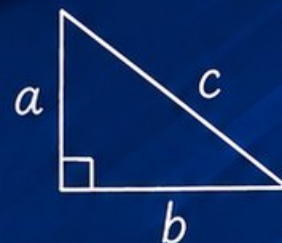
**10** PRINTED  
TESTS



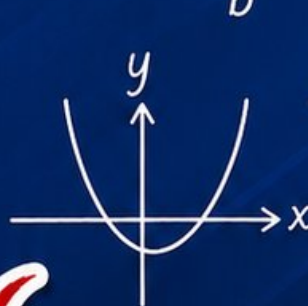
**2** ONLINE  
TESTS



- ✓ Build Confidence
- ✓ Master Key Math Skills
- ✓ Answer Explanations for Every Question
- ✓ Test-Taking Strategies That Work



$$y = mx + b$$



$$3x - 7 = 2(x + 5)$$
$$x = 17$$



USE THESE TWO  
**ADDITIONAL ONLINE  
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER  
THE PRINTED TESTS  
IN THIS BOOK.

# 10 Virginia SOL Grade 8 Math Practice Tests

*Virginia Grade 8 SOL Practice for historic-route review of proportional thinking, real numbers, algebra, geometry, and data analysis*



Ten complete 40-question Grade 8 SOL practice rounds with linear relationships, scientific notation, real numbers, equations, functions, geometry, data analysis, probability, answer keys, and clear explanations for every item.

**Jay Daie and Reza Nazari**



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# Welcome, Virginia Grade 8 Problem Solver!

Ten focused rounds for sharper Virginia SOL math thinking

This book gives you ten full Grade 8 SOL math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

**Grade 8 standards focus:** This page supports **Understanding Scientific Notation** (8.NS.1): Compare and order real numbers expressed in scientific notation. A second useful connection is **Transformations on the Coordinate Plane** (8.MG.3): Given a preimage, identify coordinates of the image after translation, reflection, or combination.

## Your Virginia Practice Promise

I will read every question carefully, choose a strategy that fits, write enough work to prove my answer, and use corrections as training for the next test.

Read

Model

Verify

## How to Use This Book

A ten-session plan for confident Grade 8 review

1. **Warm up with the review pages.** Notice the big ideas before starting the tests.
2. **Complete one test at a time.** Treat each 40-question round like a real practice session.
3. **Show your reasoning.** Jot a proportion, equation, diagram, number line, or quick estimate when it helps.
4. **Correct actively.** Rework missed items before reading the explanation.
5. **Choose the next target.** After each test, name one skill and one habit to improve.

**Grade 8 standards focus:** Keep the routine connected to **Slope as Rate of Change** (8.PFA.3): Describe key characteristics of linear functions including slope ( $m$ ) and y-intercept ( $b$ ). It also prepares you for **Volume of Cylinders, Cones, and Spheres** (8.MG.2): Determine the volume of cones and square-based pyramids.

**Virginia review rhythm:** Work a test, score it, study your misses, then come back ready for the next round with one clear goal.



## What Is Inside?

Ten Virginia SOL tests, 400 questions, and a complete review path

| Part         | What You Will Practice                                                                                    |
|--------------|-----------------------------------------------------------------------------------------------------------|
| Tests 1–3    | Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading. |
| Tests 4–6    | Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.          |
| Tests 7–9    | Data analysis, probability, mixed review, stamina, and choosing efficient strategies.                     |
| Test 10      | A final Virginia round to show growth across the whole book.                                              |
| Answer Pages | Compact keys and explanations that show why each answer works.                                            |

The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.

**Grade 8 standards focus:** Use these habits while practicing **Solving Systems of Two Equations** (8.PFA.4): Note: Systems of equations are not a dedicated 2023 Virginia SOL Grade 8 standard. Covered as extension of 8.PFA.4. Another recurring target is **Scatter Plots and Patterns in Data** (8.PS.3): Apply the data cycle with a focus on scatterplots. Construct and analyze scatterplots.



Scan me!  
For more practice  
& answers

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1) Solve for  $x$ :  $3(x - 4) = 2x + 5$

☐ A.  $x = -7$

☐ C.  $x = 17$

☐ B.  $x = 7$

☐ D.  $x = 9$

2) A cube has an edge length of 3 inches. Find its total surface area.

☐ A.  $9 \text{ in}^2$

☐ C.  $54 \text{ in}^2$

☐ B.  $27 \text{ in}^2$

☐ D.  $81 \text{ in}^2$

3) Which expression cannot be simplified using exponent laws?

☐ A.  $\frac{a^3}{b^5} \cdot a^2$

☐ C.  $a^3 + a^2$

☐ B.  $\frac{a}{b^2}$

☐ D.  $(c^2)^3$

4)  $(4.8 \times 10^{-2}) \times (1.25 \times 10^2) = ?$

☐ A.  $0.6 \times 10^0$

☐ C.  $6 \times 10^0$

☐ B.  $6 \times 10^{-1}$

☐ D.  $6 \times 10^{-4}$

5) Does the relation  $\{(5, 10), (5, 15), (6, 12)\}$  represent a function?

☐ A. Yes, because all  $y$ -values are positive.

☐ C. Yes, because there are three ordered pairs.

☐ B. No, because 5 is paired with two different outputs.

☐ D. No, because 10 and 15 are both outputs.

6) Function with slope 2 and  $y$ -intercept  $-5$  is?

☐ A.  $y = 2x - 5$

☐ C.  $y = 2x + 5$

☐ B.  $y = -5x + 2$

☐ D.  $y = -2x - 5$



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& answers

7) Which table represents the linear function  $y = 4x - 2$ ?

☐ A.

| $x$ | $y$ |
|-----|-----|
| 0   | -2  |
| 1   | 2   |
| 2   | 6   |

☐ B.

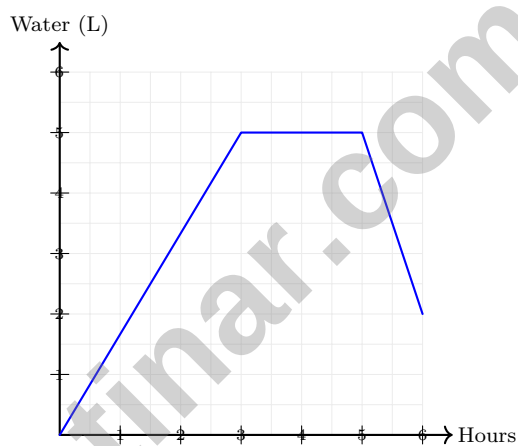
| $x$ | $y$ |
|-----|-----|
| 0   | 4   |
| 1   | 5   |
| 2   | 6   |

☐ C.

| $x$ | $y$ |
|-----|-----|
| 0   | 2   |
| 1   | 6   |
| 2   | 10  |

☐ D.

| $x$ | $y$ |
|-----|-----|
| 0   | 0   |
| 1   | 4   |
| 2   | 8   |



8)

A pool is filled, maintained, then drained. How long is the pool at its maximum level?

☐ A. 2 hours

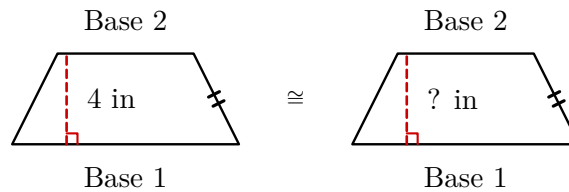
☐ C. 5 hours

☐ B. 3 hours

☐ D. 1 hour



- 9) Two congruent trapezoids are shown with side length markings. Trapezoid 1 has a height of 4 inches. What is the height of Trapezoid 2?



- ☐ A. 2 inches
- ☐ B. 4 inches
- ☐ C. 8 inches
- ☐ D. Cannot be determined
- 10) What is the pre-image of point  $(4, -2)$  if it was produced by the translation  $(x, y) \rightarrow (x + 3, y - 5)$ ?
- ☐ A.  $(7, 3)$
- ☐ B.  $(7, -7)$
- ☐ C.  $(1, -7)$
- ☐ D.  $(1, 3)$
- 11) Solve for  $x$ :  $x^3 = 343$

- 12) Parallel lines are cut by a transversal. If corresponding angles are  $(5x - 10)^\circ$  and  $(3x + 50)^\circ$ , find  $x$ .

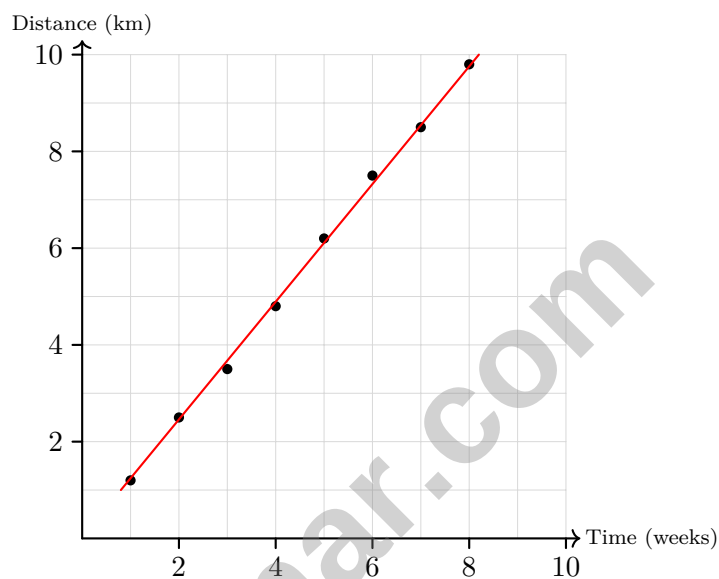
- ☐ A. 15
- ☐ B. 20
- ☐ C. 25
- ☐ D. 30



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& answers

- 1) A store advertises: “Pay \$250 down and \$150/month for 12 months.” If the item costs \$1,500 cash, what is the finance charge?

☐ A. \$0
 ☐ C. \$100  
☐ B. \$50
 ☐ D. \$550



2)

A runner training program tracks distance over time. Based on the trend line, what is the approximate slope (distance per week)?

☐ A. 1 km per week
 ☐ C. 2 km per week  
☐ B. 1.2 km per week
 ☐ D. 0.5 km per week

- 3) A cube is dilated by a scale factor of 2. If the original cube has volume  $27 \text{ cm}^3$ , what is the volume of the dilated cube?

☐ A.  $54 \text{ cm}^3$ 
☐ C.  $216 \text{ cm}^3$   
☐ B.  $108 \text{ cm}^3$ 
☐ D.  $81 \text{ cm}^3$



4) A student evaluated  $f(x) = 3x + 2$  at  $x = 4$  and wrote  $f(4) = 3 + 2 + 4 = 9$ . What error did the student make?

- ☐ A. Did not multiply  $x$  by the coefficient 3  
☐ B. Multiplied 3 by 4 correctly but made an arithmetic mistake  
☐ C. Added the constant instead of substituting correctly  
☐ D. The answer is correct

### Decimal Classification

Terminating

Repeating

0.25  
0.5

0.33  
0.142857

5)

Both categories shown contain rational numbers. Which is irrational?

- ☐ A. 0.1234567 (terminating)  
☐ B. 0.999... (repeating 9's)  
☐ C.  $\frac{22}{7}$   
☐ D. 0.3030030003... (non-repeating)

6) Which fraction equals  $0.\overline{12}$ ?

- ☐ A.  $\frac{12}{100}$   
☐ B.  $\frac{1}{12}$   
☐ C.  $\frac{12}{90}$   
☐ D.  $\frac{12}{99} = \frac{4}{33}$

7) To the nearest whole number,  $\sqrt{30} \approx$ ?

- ☐ A. 7  
☐ B. 6  
☐ C. 4  
☐ D. 5



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& answers

1) Which is the best estimate of  $\pi + \sqrt{5}$ ?

☐ A. 4.6

☐ C. 6.0

☐ B. 7.8

☐ D. 5.4

2) Expand  $(x - 3)^2$ .

☐ A.  $x^2 - 6x + 9$

☐ C.  $x^2 + 6x + 9$

☐ B.  $x^2 - 9$

☐ D.  $x^2 - 6x - 9$

3) Point  $M(-3, 2)$  is reflected across the line  $y = x$ . What are the coordinates of  $M'$ ?

☐ A.  $(2, -3)$

☐ C.  $(-3, -2)$

☐ B.  $(-2, 3)$

☐ D.  $(3, -2)$

4) A plane is descending. Its altitude decreases 2000 feet for every 5 minutes. What is the slope of altitude versus time?

☐ A. 400 feet per minute

☐ C.  $\frac{5}{2000}$  feet per minute

☐ B. 2000 feet per minute

☐ D. -400 feet per minute

5) A store has two types of mangoes. Premium mangoes cost \$2 each, standard mangoes cost \$1 each. A customer buys 15 mangoes for \$20. Solving the system  $p + s = 15$  and  $2p + s = 20$  gives  $p = 5, s = 10$ . Is this solution valid in the real world?

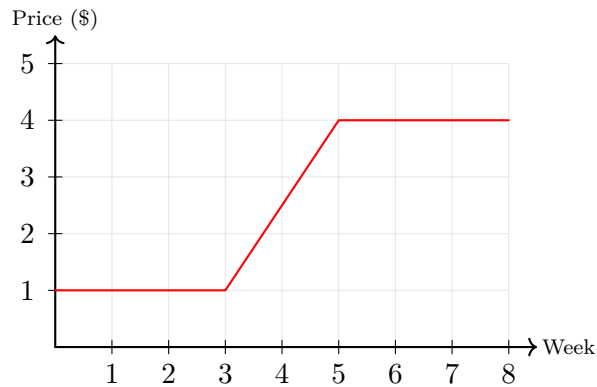
☐ A. No, because only the first equation is satisfied.

☐ C. Yes, because it represents a realistic purchase.

☐ B. No, because  $p$  is not a whole number.

☐ D. No, because the total cost should be higher.





6)

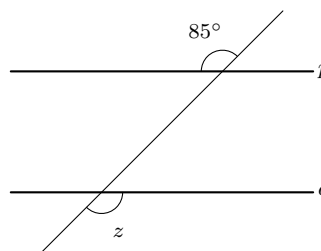
An item's price over 8 weeks is shown. During which week does the price increase the fastest?

☐ A. Weeks 1-3☐ C. Weeks 3-5☐ B. Week 3☐ D. Weeks 5-8

7) A figure is reflected across a line and then rotated. Which statement is always true?

☐ A. The figure changes size☐ C. The resulting figure is congruent to the original☐ B. The angles are no longer equal☐ D. The perimeter increases

8) In the figure, parallel lines are cut by a transversal. If the angle marked is  $85^\circ$ , find the alternate exterior angle.

☐ A.  $85^\circ$ ☐ C.  $105^\circ$ ☐ B.  $95^\circ$ ☐ D.  $145^\circ$ 

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For more practice  
& answers

**Virginia SOL Grade 8 Practice Test Answer Keys****How to use this section with a Grade 8 student:**

1. check the answer first and circle any item that needs another look
2. retry the problem with fresh work before reading the explanation
3. write one short lesson learned from each missed or guessed item

**A strong review routine turns every correction into a sharper plan for the next Virginia SOL practice test.**

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## Practice Test Answers and Explanations

### Practice Test 1 Answers and Explanations

- 1) **Choice C is correct.** (8.PFA.4) Distribute:  $3x - 12 = 2x + 5$ . Subtract  $2x$ :  $x - 12 = 5$ . Add 12:  $x = 17$ . Check:  $3(17 - 4) = 3(13) = 39$  and  $2(17) + 5 = 39$  ✓. (Distractor B from forgetting to distribute the 3; D from arithmetic error.)
- 2) **Choice C is correct.** (8.MG.2) A cube has 6 faces. Each face has area  $3^2 = 9$  in<sup>2</sup>. Total =  $6 \times 9 = 54$  in<sup>2</sup>.
- 3) **Choice C is correct.** (8.PFA.1) Addition/subtraction of powers requires like terms with same base AND exponent.  $a^3 + a^2$  are not like terms.
- 4) **Choice C is correct.** (8.NS.1) Multiply coefficients:  $4.8 \times 1.25 = 6$ . Add exponents:  $10^{-2+2} = 10^0 = 1$ . Result:  $6 \times 10^0 = 6 \times 1 = 6$ .
- 5) **Choice B is correct.** (8.PFA.2) Input 5 maps to both 10 and 15, violating the definition of a function.
- 6) **Choice A is correct.** (8.PFA.2) In  $y = mx + b$ :  $m = 2$ ,  $b = -5$ , so  $y = 2x - 5$ .
- 7) **Choice A is correct.** (8.PFA.3) When  $x = 0$ :  $y = 4(0) - 2 = -2$ . When  $x = 1$ :  $y = 4(1) - 2 = 2$ . When  $x = 2$ :  $y = 4(2) - 2 = 6$ . This matches option A.
- 8) **Choice A is correct.** (8.PFA.3) The graph is flat at 5 liters from hour 3 to hour 5, a duration of 2 hours.
- 9) **Choice B is correct.** (8.MG.3) Congruent trapezoids have equal heights. Since Trapezoid 1 has a height of 4 inches and Trapezoid 2 is congruent, Trapezoid 2 also has a height of 4 inches.
- 10) **Choice D is correct.** (8.MG.3) Reverse the translation:  $(x, y) \rightarrow (x - 3, y + 5)$ . So  $(4, -2) \rightarrow (4 - 3, -2 + 5) = (1, 3)$ .
- 11) **The correct answer is 7.** (8.NS.1)  $\sqrt[3]{343} = 7$  because  $7 \times 7 \times 7 = 343$ .
- 12) **Choice D is correct.** (8.MG.1) Corresponding angles are equal:  $5x - 10 = 3x + 50$ , so  $2x = 60$  and  $x = 30$ .
- 13) **Choice B is correct.** (8.MG.4) From  $2^2 + 3^2 = c^2$ , we get  $4 + 9 = 13$ , so  $c = \sqrt{13} \approx 3.61$ .
- 14) **Choice B is correct.** (8.MG.2) Sphere:  $V_s = \frac{4}{3}\pi r^3$ . Cylinder:  $V_c = \pi r^2(2r) = 2\pi r^3$ . Ratio:  $\frac{V_c}{V_s} = \frac{2\pi r^3}{\frac{4}{3}\pi r^3} = \frac{2 \times 3}{4} = 1.5$ .
- 15) **Choice C is correct.** (8.MG.1) The supplement of an angle is found by subtracting from  $180^\circ$ :  $180 - 29 = 151^\circ$ .
- 16) **Choice C is correct.** (8.MG.5) The perimeter includes two straight sides of 16 m and two semicircles that make one full circle with diameter 4 m. So  $P = 16 + 16 + 3.14(4) = 44.56$  m.
- 17) **Choice B is correct.** (8.PS.3) When points cluster tightly around a line, the correlation is stronger. When points are widely scattered, the correlation is weaker. Students should judge strength by how closely points cluster around an imaginary trend line.
- 18) **Choice C is correct.** (8.PS.3) Substitute  $n = 100$ :  $C = 2(100) + 50 = 200 + 50 = \$250$ .
- 19) **Choice B is correct.** (8.PS.3) Relative frequency of improvement among medicated patients:  $\frac{160}{200} = 0.80$ .
- 20) **The correct answer is 6.** (8.PFA.3) The unit rate is 6 miles per hour, so  $k = 6$  and  $d = 6t$ .
- 21) **Choice D is correct.** (8.PFA.4) The first two systems are lines with different equations but the same form (both are  $x = 2$  or  $y = 4$ , not two distinct lines). Option C has parallel lines (same slope, different intercepts). Option D has different slopes, so the lines intersect at exactly one point.
- 22) **The correct answer is A, C.** (8.PS.1) A is correct:  $P(\text{heads}) = \frac{1}{2}$ . C is correct:  $P(\text{heads and 4}) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$ . B is wrong:  $P(4) = \frac{1}{6}$ . D is wrong: total outcomes = 12. E is wrong:  $P(\text{not heads}) = \frac{1}{2}$ .
- 23) **Choice A is correct.** (8.PFA.4) Trinomial  $x^2 + 9x + 20$  factors as  $(x + 4)(x + 5)$  (multiply:  $4 \cdot 5 = 20$ , add:  $4 + 5 = 9$ ).
- 24) **Choice D is correct.** (8.PFA.3)  $y = x^3$  has  $x$  raised to the power 3, making it nonlinear. The other three options are all linear (form  $y = mx + b$ ).
- 25) **The correct answer is 6.** (8.PFA.5) Add 5 and divide by 2:  $x \geq 6$ . The boundary value is 6.
- 26) **Choice A is correct.** (8.MG.4)  $c = \sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$ . (This is a 9-12-15 triple, a multiple of 3-4-5.)
- 27) **Choice B is correct.** (8.MG.2)  $192 = \frac{1}{3} \times 64 \times h \Rightarrow h = \frac{192 \times 3}{64} = \frac{576}{64} = 9$  cm.
- 28) **Choice C is correct.** (8.PS.3) Mean = 8. Absolute deviations:  $|5 - 8| = 3$ ,  $|7 - 8| = 1$ ,  $|9 - 8| = 1$ ,  $|11 - 8| = 3$ . Sum = 8. MAD =  $8/4 = 2$ .



## Hi, Confident Learner!

◇ This full-length book gave you ten complete Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. Grade 8 math can feel big because it connects real numbers and exponents with linear equations, systems, functions, transformations, geometry, and data. ◇

★ **Remember this:** But big topics become manageable when you practice one skill at a time. That is what you have been doing with every test in this book. ★

### Confidence Builders

- **Know the Goal:** Identify what the question asks.
- **Use Vocabulary:** Math words point to math actions.
- **Show Work:** Give yourself something to check.
- **Celebrate Effort:** Practice is proof that you are moving.

**Grade 8 test-day tip:** When reviewing, do not only mark wrong answers. Write one sentence about what you learned from each one.

If you want to share something or ask a question, please email me at [jay@testinar.com](mailto:jay@testinar.com).

**Jay Daie**

Your Confidence Coach

# PRACTICE TODAY. SUCCEED TOMORROW!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



## THIS BOOK INCLUDES:

**10**

Full-Length  
Printed Tests

**2**

Online  
Practice Tests



Detailed Answers  
& Explanations



## MORE PRACTICE. GREATER RESULTS.

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

## WHAT YOU'LL GAIN



### Build Confidence

Practice regularly to feel prepared and test-ready.



### Master Key Skills

Develop strong math skills and problem solving abilities.



### Improve Understanding

Learn with clear explanations and step-by-step solutions.



### Test Strategies

Learn proven strategies to approach every question with confidence.



### Boost Performance

Apply your knowledge and achieve your best score!

## TOPICS COVERED

- |                           |                            |
|---------------------------|----------------------------|
| ✓ The Number System       | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Data Analysis            |
| ✓ Inequalities            | ✓ Measurement              |
| ✓ Functions               | ✓ Pythagorean Theorem      |
| ✓ Geometry                | ✓ Surface Area & Volume    |
| ✓ Ratios & Proportions    | ✓ And More!                |



## 2 ONLINE TESTS

Use these two additional online practice tests for extra review after the printed tests in this book.



## 2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE  
REGULARLY



STAY  
FOCUSED



SOLVE  
CONFIDENTLY



SUCCEED  
BRIGHTLY