

# 10

North Carolina

# EOG

GRADE

# 8

MATH

## PRACTICE TESTS

Standards Aligned Problem Solving  
For Comprehensive Assessment Programs

# 10

PRINTED  
TESTS



# 2

ONLINE  
TESTS



Build Confidence



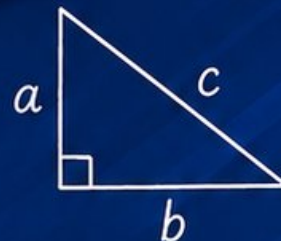
Master Key Math Skills



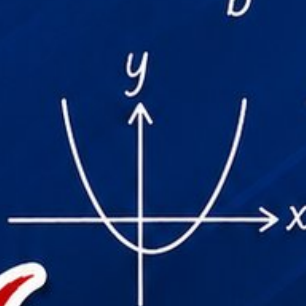
Answer Explanations for  
Every Question



Test-Taking Strategies  
That Work



$$y = mx + b$$



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

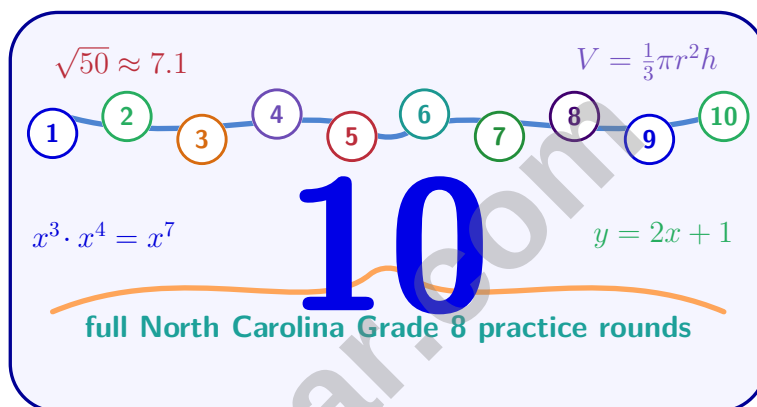


USE THESE TWO  
ADDITIONAL ONLINE  
PRACTICE TESTS

FOR EXTRA REVIEW AFTER  
THE PRINTED TESTS  
IN THIS BOOK.

# 10 North Carolina EOG Grade 8 Math Practice Tests

*North Carolina Grade 8 EOG Practice for coast-and-mountain practice in functions, scientific notation, equations, geometry, data, and probability*



Ten complete 40-question Grade 8 EOG 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, North Carolina Grade 8 Problem Solver!

Ten focused rounds for sharper North Carolina EOG math thinking

This book gives you ten full Grade 8 EOG 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 **Counting Principle and Permutations** (NC.8.NS.1): Understand that every number has a decimal expansion. Building upon the definition of a rational number, know that an irrational number is defined as a non-repeating, non-terminating decimal. Another recurring target is **Square Roots and Cube Roots** (NC.8.EE.2): Use square root and cube root symbols to represent solutions to equations of the form  $x^2 = p$  and  $x^3 = p$ , where  $p$  is a positive rational....

## Your North Carolina 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 **Estimating Irrational Numbers** (NC.8.NS.2): Use rational approximations of irrational numbers to compare their size and locate them approximately on a number line diagram. The same routine helps with **Slope and the Equations of a Line** (NC.8.G.8): Use similar triangles to explain why the slope  $m$  is the same between any two distinct points on a non-vertical line. Derive  $y = mx$  and  $y = \dots$

**North Carolina 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 North Carolina EOG 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 North Carolina 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 **Square Roots and Cube Roots** (NC.8.EE.2): Use square root and cube root symbols to represent solutions to equations of the form  $x^2 = p$  and  $x^3 = p$ , where  $p$  is a positive rational.... You will also meet **Reading Function Values** (NC.8.F.3): Find outputs from a function rule, table, or graph.



Scan me!  
For more practice  
& answers

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1) Factor  $x^2 - 11x + 24$ .

☐ A.  $(x - 3)(x - 8)$

☐ C.  $(x - 2)(x - 12)$

☐ B.  $(x - 4)(x - 6)$

☐ D.  $(x + 3)(x + 8)$

2) A square pyramid has a base with side length 8 cm and height 3 cm. Approximate the slant height and then calculate the surface area. (Use  $\sqrt{25} = 5$ .)

☐ A. Slant height  $\approx 5$  cm, SA  $\approx 129$  cm<sup>2</sup>

☐ C. Slant height  $\approx 4$  cm, SA  $\approx 113$  cm<sup>2</sup>

☐ B. Slant height  $\approx 5$  cm, SA  $\approx 144$  cm<sup>2</sup>

☐ D. Slant height  $\approx 6$  cm, SA  $\approx 161$  cm<sup>2</sup>

3) A cone has radius 6 cm and height 9 cm. A sphere has radius 5 cm. Which solid has the greater volume? (Use  $\pi \approx 3.14$ .)

☐ A. Cone ( $V \approx 339.12$  cm<sup>3</sup>)

☐ C. Both have equal volume

☐ B. Sphere ( $V \approx 523.33$  cm<sup>3</sup>)

☐ D. Cannot be determined

4) Using the model  $y = 2x - 3$ , suppose the actual data point is (5, 7), but the model predicts  $y = 7$  at  $x = 5$ . What is the residual (error)?

☐ A. 0

☐ C. -2

☐ B. 2

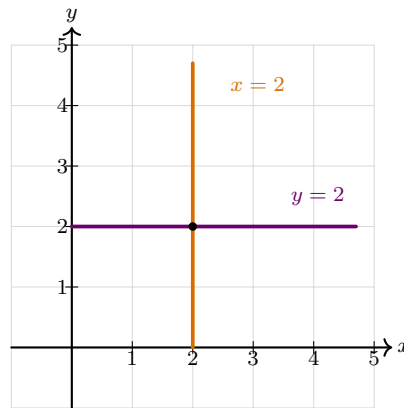
☐ D. 7

5) A holiday savings club requires \$50 monthly deposits for 12 months with no interest. What is the total saved?



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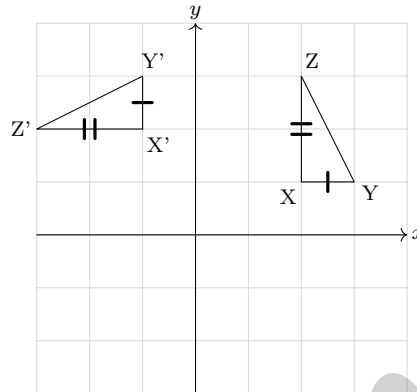
6) Graph the two equations and identify what type of solution the system has.



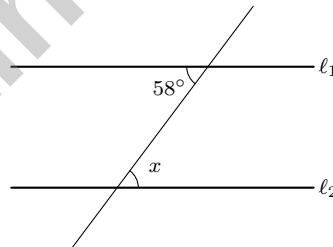
- ☐ A. No solution
- ☐ B. Infinitely many solutions
- ☐ C. Exactly one solution at  $(2, 2)$
- ☐ D. Two solutions
- 7) For the inequality  $y < -2x + 5$ , which statement about the boundary line is true?
- ☐ A. The boundary line is solid
- ☐ B. The boundary line is dashed
- ☐ C. The boundary line is vertical
- ☐ D. The boundary line is horizontal
- 8) What is the range of  $\{(-1, 4), (-3, -2), (0, 4), (2, 7), (3, -2)\}$ ?
- ☐ A.  $\{-3, -1, 0, 2, 3\}$
- ☐ B.  $\{-2, 4, 7\}$
- ☐ C.  $\{-2, 4\}$
- ☐ D.  $\{-1, 0, 2, 3\}$
- 9) Error analysis: A student says “ $y = 2x$  and  $y = 2x + 5$  have the same slope.” Is this correct?
- ☐ A. Yes, both slopes are 2
- ☐ B. No, slopes are 2 and 5
- ☐ C. No, slopes are 0 and 2
- ☐ D. Cannot determine



- 10) Triangle XYZ is mapped onto triangle X'Y'Z' by a 90-degree counterclockwise rotation about the origin. If the triangles are congruent, which of the following is true?



- ☐ A. Side  $XY$  has a different length than side  $X'Y'$   
☐ B. The angle at  $Z$  differs from the angle at  $Z'$   
☐ C. Side  $XZ =$  side  $X'Z'$   
☐ D. All angles are different after rotation
- 11) In the diagram, lines  $\ell_1$  and  $\ell_2$  are parallel. Find the measure of angle  $x$ .

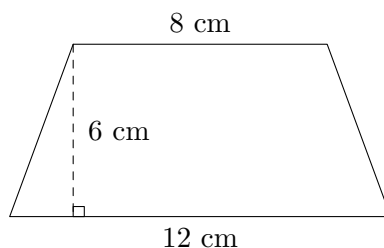


- ☐ A.  $58^\circ$   
☐ B.  $68^\circ$   
☐ C.  $122^\circ$   
☐ D.  $180^\circ$



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& answers

- 1) A trapezoid has parallel sides of 8 cm and 12 cm with a height of 6 cm. This trapezoid is part of a composite figure. What is its area?



- ☐ A.  $48 \text{ cm}^2$                       ☐ C.  $72 \text{ cm}^2$   
☐ B.  $60 \text{ cm}^2$                       ☐ D.  $80 \text{ cm}^2$
- 2) Two students sketch different trend lines through the same scatter plot. Student A's line has a gentler slope, while Student B's line has a steeper slope. What could explain this difference?
- ☐ A. One student made a calculation error                      ☐ C. Only one line can ever be correct  
☐ B. The students used different data sets                      ☐ D. Sketching a trend line by eye allows for reasonable variation
- 3) Triangle  $X$  is similar to Triangle  $Y$ . In Triangle  $X$ , one angle measures  $60^\circ$ . What is the measure of the corresponding angle in Triangle  $Y$ ?
- ☐ A.  $30^\circ$                       ☐ C.  $120^\circ$   
☐ B.  $60^\circ$                       ☐ D. Cannot be determined
- 4) If  $h(x) = 3x$ , what is  $h(-2)$ ?
- ☐ A.  $-6$                       ☐ C.  $-2$   
☐ B.  $6$                       ☐ D.  $3$



5) Which pair of numbers are both irrational?

☐ A.  $\sqrt{121}$  and  $\pi$

☐ C.  $-\frac{3}{7}$  and  $\sqrt{15}$

☐ B.  $0.505005\dots$  (non-repeating) and  $\sqrt{16}$

☐ D.  $\sqrt{15}$  and  $\sqrt{24}$

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

☐ A.  $\frac{12}{100}$

☐ C.  $\frac{12}{90}$

☐ B.  $\frac{1}{12}$

☐ D.  $\frac{12}{99} = \frac{4}{33}$

7) Which is the best estimate of  $\pi + \sqrt{10}$ ?

☐ A.  $3.1 + 3.1 = 6.2$

☐ C.  $4 + 4 = 8$

☐ B.  $\pi + 10 = 13.14$

☐ D.  $3.14 + 3.16 = 6.30$

8) A laptop costs \$1,200 cash. The store's installment offer is \$110/month for 12 months. Which analysis correctly explains why someone might choose installments despite the extra cost?

☐ A. Installments save money (\$120 is refunded later)

☐ C. Installments are always cheaper than paying cash

☐ B. The store benefits, so customers should too

☐ D. The customer doesn't have \$1,200 cash now but can afford \$110/month

9) A chemist combines a 25% salt solution with an 80% salt solution to make 100 mL of a 50% solution. How many mL of the 25% solution are used?



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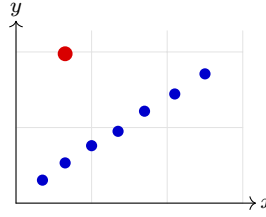
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1)

In a scatter plot, an **outlier** is best defined as:

- ☐ A. A data point that lies far from the general pattern or trend of the data
- ☐ B. Any point that does not fall exactly on a perfect line
- ☐ C. The point with the largest x-value
- ☐ D. The point with the smallest y-value

2) Which value is closest to  $\sqrt{35}$ ?

- ☐ A. 5
- ☐ B. 7
- ☐ C. 6
- ☐ D. 5.8

3) Two stores sell notebooks. Store A: 4 notebooks for \$8. Store B: 5 notebooks for \$12. Which has the lower unit price?

- ☐ A. Store A (\$2.40 each)
- ☐ B. Store B (\$2.40 each)
- ☐ C. Store A (\$2 each)
- ☐ D. Same price

4) The equation  $y = 12x + 50$  represents a driver's earnings in dollars, where  $x$  is the number of hours worked. What does the slope 12 represent?

- ☐ A. Hourly wage of \$12
- ☐ B. Total earnings of \$12
- ☐ C. Initial debt of \$12
- ☐ D. Number of hours worked



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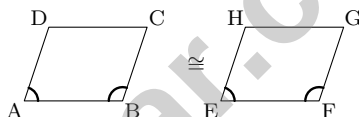
- 5) A store notices that for every 2 customers who enter, 1 item is sold. What is the slope of items sold versus customers?

☐ A. 2 ☐ C. 3  
☐ B.  $-\frac{1}{2}$  ☐ D.  $\frac{1}{2}$

- 6) A student uses elimination to solve:  $3x + 2y = 16$  and  $5x - 2y = 24$ . They add the equations to get  $8x = 40$ , so  $x = 5$ . Then they substitute to find  $y = 0.5$ . Is this correct?

☐ A. No, adding eliminates  $x$ , not  $y$ . ☐ C. No, the system has no solution.  
☐ B. No, the substitution is wrong. ☐ D. Yes, the solution is correct.

- 7) Two congruent quadrilaterals are shown. A student reasons: "Since two angles are equal, the quadrilaterals must be congruent." What is wrong with this reasoning?



☐ A. Two equal angles alone do NOT guarantee congruence ☐ C. The student's reasoning is correct; angle equality proves congruence  
☐ B. Equal angles guarantee equal side lengths ☐ D. Congruent figures never have equal angles

- 8) Two angles in a triangle measure  $29^\circ$  and  $71^\circ$ . Find the third angle.

☐ A.  $42^\circ$  ☐ C.  $80^\circ$   
☐ B.  $70^\circ$  ☐ D.  $100^\circ$



**North Carolina EOG 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 North Carolina EOG practice test.**

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## Practice Test Answers and Explanations

### Practice Test 1 Answers and Explanations

- 1) **Choice B is correct.** (NC.8.EE.8) Find two numbers that multiply to 24 and add to -11: -4 and -6. Verify:  $(-4)(-6) = 24$  and  $-4 - 6 = -11$ .
- 2) **Choice B is correct.** (NC.8.G.9) The distance from the center to the midpoint of a base edge is 4 cm. Slant height  $\ell = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$  cm. Base area =  $64 \text{ cm}^2$  and lateral area =  $4 \times \frac{1}{2}(8)(5) = 80 \text{ cm}^2$ , so total surface area is  $144 \text{ cm}^2$ .
- 3) **Choice B is correct.** (NC.8.G.9) Cone:  $V = \frac{1}{3} \times 3.14 \times 36 \times 9 = 339.12 \text{ cm}^3$ . Sphere:  $V = \frac{4}{3} \times 3.14 \times 125 = 523.33 \text{ cm}^3$ .
- 4) **Choice A is correct.** (NC.8.SP.3) Residual = actual - predicted =  $7 - 7 = 0$ . The model predicts perfectly for this point.
- 5) **The correct answer is \$600.** (NC.8.G.7)  $50 \times 12 = \$600$ .
- 6) **Choice C is correct.** (NC.8.EE.8) A horizontal line  $y = 2$  and a vertical line  $x = 2$  intersect at exactly one point:  $(2, 2)$ .
- 7) **Choice B is correct.** (NC.8.EE.8) A strict inequality, such as  $<$ , uses a dashed boundary line because points on the line are not included in the solution.
- 8) **Choice B is correct.** (NC.8.F.1) The range is the set of all output ( $y$ ) values: 4, -2, 4, 7, -2. Written as a set without repetition:  $\{-2, 4, 7\}$ .
- 9) **Choice A is correct.** (NC.8.F.2) Both  $y = 2x$  and  $y = 2x + 5$  have slope  $m = 2$ . The  $y$ -intercepts differ (0 vs 5), but slopes are equal. Student is correct.
- 10) **Choice C is correct.** (NC.8.G.9) A 90-degree counterclockwise rotation is a rigid motion that preserves all distances and angles. When triangle XYZ is rotated about the origin, each vertex moves but distances between vertices remain the same. Therefore, all corresponding sides and angles are equal:  $XZ = X'Z'$ ,  $XY = X'Y'$ ,  $YZ = Y'Z'$ , and all angles match.
- 11) **Choice A is correct.** (NC.8.G.5) Alternate interior angles formed by parallel lines and a transversal are congruent.
- 12) **Choice A is correct.** (NC.8.G.6, NC.8.G.7) From  $(\sqrt{2})^2 + (\sqrt{6})^2 = c^2$ , we get  $2 + 6 = 8$ , so  $c = \sqrt{8} = \sqrt{4 \cdot 2} = 2\sqrt{2}$ .
- 13) **Choice A is correct.** (NC.8.G.8)  $d = \sqrt{(7-0)^2 + (24-0)^2} = \sqrt{49 + 576} = \sqrt{625} = 25$ .
- 14) **Choice C is correct.** (NC.8.G.5) All four angles at an intersection sum to  $360^\circ$ . The fourth angle is  $360 - 240 = 120^\circ$ .
- 15) **Choice B is correct.** (NC.8.G.7)  $V = \frac{1}{3}s^2h$ . So  $128 = \frac{1}{3}s^2(8)$ , which gives  $s^2 = 48$ . Therefore  $s = \sqrt{48} = 4\sqrt{3}$  inches.
- 16) **Choice B is correct.** (NC.8.G.5) A hexagon's interior angles add to  $720^\circ$ . The known angles add to  $68 + 118 + 102 + 150 + 106 = 544^\circ$ , so the sixth angle is  $720 - 544 = 176^\circ$ .
- 17) **Choice A is correct.** (NC.8.G.8) Mean = 5. All values equal the mean, so all deviations are 0.  $MAD = 0/5 = 0$ .
- 18) **Choice D is correct.** (NC.8.EE.2)  $s = \sqrt{200} = \sqrt{100 \times 2} = 10\sqrt{2} \approx 14.14$  meters.
- 19) **The correct answer is A,D.** (NC.8.SP.4) Statement A is correct because  $150 \div 300 = 0.50$ . Statement D is correct because  $150 \div 500 = 0.30$ . Statement B is false as written because  $100 \div 500 = 0.20$ , not 0.50. Statements C and E are false.
- 20) **Choice C is correct.** (NC.8.EE.1) Slope =  $\frac{2}{7} \approx 0.286 \approx 0.29$ . This is a shallow line (slope less than 1).
- 21) **The correct answer is 0.125.** (NC.8.EE.1)  $2^{-3} = \frac{1}{2^3} = \frac{1}{8} = 0.125$ .
- 22) **Choice C is correct.** (NC.8.F.3) The  $y$ -values double with each unit increase in  $x$  (2, 4, 8, 16). This exponential growth pattern is nonlinear; first differences are not constant (2, 4, 8).
- 23) **Choice A is correct.** (NC.8.F.5) 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.
- 24) **Choice A is correct.** (NC.8.F.5) The instant pump-dry event is shown with a dashed vertical jump from 4 to 0 at  $t = 2$ . This marks a discontinuity, not a gradual change over time.
- 25) **Choice B is correct.** (NC.8.G.3)  $D' = (8, 10)$ . Distance:  $\sqrt{8^2 + 10^2} = \sqrt{64 + 100} = \sqrt{164} = 2\sqrt{41}$ .
- 26) **Choice A is correct.** (NC.8.NS.2) Large rectangle area =  $20 \times 8 = 160 \text{ m}^2$ . Small rectangle area =  $6 \times 3 = 18 \text{ m}^2$ . Remaining =  $160 - 18 = 142 \text{ m}^2$ .



## Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 10 full Grade 8 practice tests, and that repeated effort matters. ★

### Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

**Grade 8 test-day tip:** When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

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

**Jay Daie**

Your Persistence 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
- ✓ Expressions & Equations
- ✓ Inequalities
- ✓ Functions
- ✓ Geometry
- ✓ Ratios & Proportions
- ✓ Statistics & Probability
- ✓ Data Analysis
- ✓ Measurement
- ✓ Pythagorean Theorem
- ✓ Surface Area & Volume
- ✓ 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