

9

North Carolina

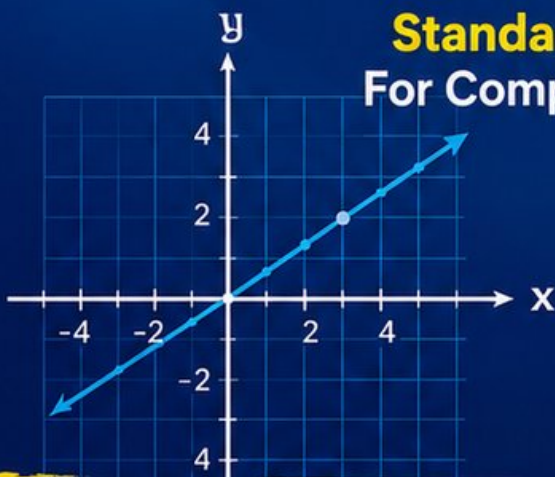
EOG

Grade 8

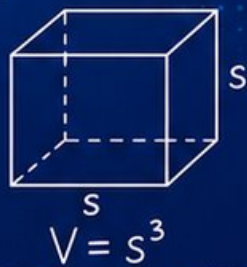
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



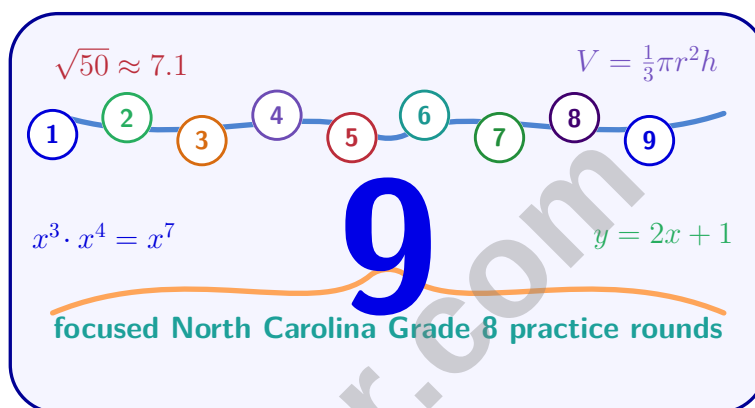
$$2x + 3y = 12$$
$$y = mx + b$$

**9** PRINTED
TESTS**2** ONLINE
TESTS

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

9 North Carolina EOG Grade 8 Math Practice Tests

North Carolina Grade 8 Math Practice for Equations, Graphs, Geometry, and Data Skills



Nine complete 40-question Grade 8 EOG practice rounds with real numbers, exponents, scientific notation, equations, functions, transformations, 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!

Nine focused rounds for sharper EOG math thinking

This book gives you nine full Grade 8 EOG math practice tests. Each round is built to help you recognize structure, reason with real numbers and exponents, analyze linear relationships, connect equations with graphs, and explain your thinking with care.

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 nine-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 an exponent rule, equation, graph, transformation, diagram, 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.

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?

Nine EOG tests, 360 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real and irrational numbers, integer exponents, scientific notation, equations, and careful reading.
Tests 4–6	Slope, systems of equations, functions, inequalities, transformations, congruence, and similarity.
Tests 7–9	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
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.

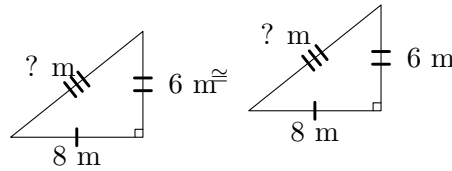


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& answers

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- 1) Two congruent right triangles are shown. Triangle 1 has legs of 6 m and 8 m. What is the hypotenuse of Triangle 2?



- ☐ A. 5 m ☐ C. 10 m
☐ B. 7 m ☐ D. 14 m
- 2) Under which transformation would the image of a point (x, y) always lie on the opposite side of the origin from the original point?
- ☐ A. Reflection across the x -axis ☐ C. 180° rotation about the origin
☐ B. Reflection across the y -axis ☐ D. Translation 5 units right
- 3) The line through $(a, 2)$ and $(3, 8)$ has slope 2. What is the value of a ?
- ☐ A. 0 ☐ C. 2
☐ B. 1 ☐ D. 6
- 4) Consider the equation $3x + 7 = 3x + 2$. How many solutions does this have?
- ☐ A. One solution ☐ C. Infinitely many solutions
☐ B. Cannot be determined ☐ D. No solution
- 5) To simplify $\frac{(w^4)^3}{w^6}$, which law should be applied first?
- ☐ A. Quotient rule ☐ C. Product rule
☐ B. Zero exponent rule ☐ D. Power of a power rule



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6) Solve: $\frac{x-2}{5} \leq 3$

☐ A. $x \leq 13$

☐ C. $x \leq 17$

☐ B. $x \geq 13$

☐ D. $x \geq 17$

7) Which inequality's graph has a solid boundary line AND shades the region BELOW a negatively-sloped line?

☐ A. $y > -2x + 5$

☐ C. $y \geq -2x + 5$

☐ B. $y < -2x + 5$

☐ D. $y \leq -2x + 5$

8) Which statement best defines a function?

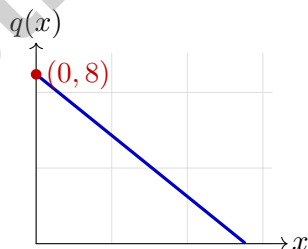
☐ A. A relation where every output has exactly one input.

☐ C. A set of ordered pairs with different x -coordinates.

☐ B. A relation where every input has exactly one output.

☐ D. Any relation that includes both positive and negative values.

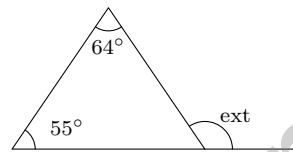
9) Two linear functions: $p(x) = -x + 10$ (verbal: "starts at 10, decreases by 1 each step"). Function q shown in graph through $(0, 8)$ with slope -1.5 . Which has more negative slope?


☐ A. Function p
☐ C. Equal negative slopes

☐ B. Function q
☐ D. Not comparable


- 10) Estimate $\sqrt{50}$ to the nearest tenth and explain how you found your estimate.

- 11) An exterior angle of a triangle is formed by extending one side. If the two non-adjacent interior angles are 55° and 64° , what is the exterior angle?



- ☐ A. 64°
☐ C. 109°
☐ B. 89°
☐ D. 119°
- 12) A rectangular field is 70 meters long and 24 meters wide. A diagonal path crosses from one corner to the opposite corner. How many meters shorter is the diagonal path than walking the length and width?
- ☐ A. 46 m
 ☐ C. 50 m
☐ B. 20 m
 ☐ D. 94 m
- 13) A store offers a warranty on a \$600 laptop for \$89. The warranty covers 2 years. Based on historical data, 1 in 10 laptops need repair costing an average of \$300. Is the warranty a good deal?
- ☐ A. Yes; expected repair cost is \$89
 ☐ C. No; expected repair cost is \$30
☐ B. Yes; warranty costs less than repairs
 ☐ D. No; warranty should be free

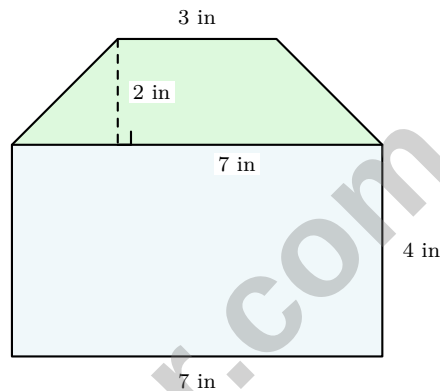


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- 1) A temperature increases by 3° per hour. If it starts at 12°C and must stay below 30°C , which inequality represents valid times (in hours)?

- ☐ A. $t < 6$
☐ C. $t \leq 6$
☐ B. $t > 6$
☐ D. $t \geq 6$

- 2) An irregular polygon is decomposed into a rectangle (7 in by 4 in) and a trapezoid (bases 7 in and 3 in, height 2 in). Find the total area.



- ☐ A. 28 in^2
☐ C. 42 in^2
☐ B. 38 in^2
☐ D. 50 in^2

- 3) A square pyramid has a volume of 343 cm^3 and a height of 7 cm. What is the length of each base edge?

- ☐ A. 7 cm
 ☐ C. 14 cm
☐ B. $7\sqrt{3}$ cm
 ☐ D. 21 cm

- 4) Which data set most likely has a MAD less than 1? (*Which set is most tightly clustered?*)

- ☐ A. $\{10, 11, 10, 11, 10\}$ (tightly clustered)
☐ B. $\{1, 2, 3, 4, 5, 6\}$ (moderate spread)
☐ C. $\{5, 10, 2, 15, 1\}$ (very spread out)
☐ D. $\{1, 3, 5, 7, 9\}$ (evenly spaced)



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5) A student is asked: “There are 6 routes from city A to city B, and 5 routes from city B to city C. How many different routes from A to C through B are there?” The student writes: $6 + 5 = 11$. What is the correct answer?

- ☐ A. 11 (student is correct) ☐ C. 1 (routes are not independent)
☐ B. 30 (use Counting Principle: 6×5) ☐ D. $6^5 = 7,776$

6) Four scatter plots are shown with different correlation patterns. Which plot would be most useful for predicting the value of one variable given the other?

- ☐ A. Weak positive correlation with many outliers ☐ C. No correlation with random scatter
☐ B. Strong positive correlation with minimal scatter ☐ D. Perfect nonlinear association

7) A two-way table tracks 400 students by extracurricular activity:

	Sports	No Sports	Total
Music	120	80	200
No Music	100	100	200
Total	220	180	400

What is the marginal relative frequency for students who do sports, as a decimal?

- ☐ A. 0.27 ☐ C. 0.55
☐ B. 0.45 ☐ D. 0.73

Number Sorting

π , $\sqrt{4}$, $0.\bar{5}$, -2.5 , $\sqrt{11}$

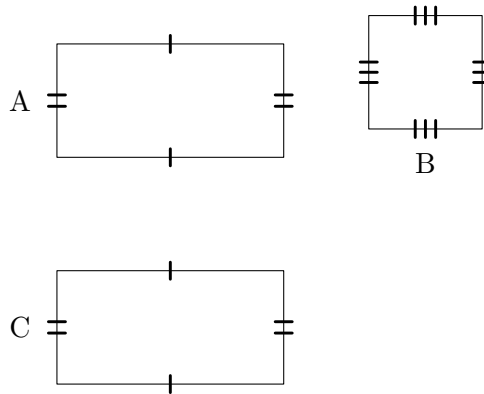
How many are rational?

8)

- ☐ A. One ($\sqrt{4}$ only) ☐ C. Three ($\sqrt{4}$, $0.\bar{5}$, and -2.5)
☐ B. Two ($\sqrt{4}$ and $0.\bar{5}$) ☐ D. Four (all but π or $\sqrt{11}$)



5) Which pair of figures is congruent?



☐ A. Figures A and B

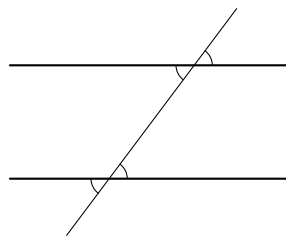
☐ C. Figures B and C

☐ B. Figures A and C

☐ D. None are congruent

6) Solve the system $\begin{cases} x + y = 8 \\ x - y = 2 \end{cases}$ by elimination.

7) Two parallel lines cut by a transversal create angle pairs. Which type of angles are congruent?



☐ A. Only adjacent angles

☐ C. All angles formed

☐ B. Corresponding, alternate interior, and alternate exterior

☐ D. Only angles on the same side



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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 C is correct.** (NC.8.G.9) Using the Pythagorean Theorem on Triangle 1: $c^2 = 6^2 + 8^2 = 36 + 64 = 100$, so $c = 10$ m. Triangle 2 is congruent, so its hypotenuse is also 10 m.
- 2) **Choice C is correct.** (NC.8.G.6) A 180° rotation maps $(x, y) \rightarrow (-x, -y)$, placing the image on the opposite side of the origin. Single reflections across axes do not have this property.
- 3) **Choice A is correct.** (NC.8.G.8) Using slope formula: $2 = \frac{8-a}{3-a}$, so $2(3-a) = 6$, giving $6-2a = 6$, thus $a = 0$.
- 4) **Choice D is correct.** (NC.8.EE.8) Subtract $3x$: $7 = 2$, which is false. No value of x satisfies this equation.
- 5) **Choice D is correct.** (NC.8.EE.1) Simplify the numerator first: $(w^4)^3 = w^{12}$ (power of a power), then apply quotient rule.
- 6) **Choice C is correct.** (NC.8.EE.7) Multiply by 5: $x - 2 \leq 15$. Add 2: $x \leq 17$.
- 7) **Choice D is correct.** (NC.8.EE.8) Solid line requires $\leq$ or $\geq$. Shading BELOW a negative slope means $\leq$. Combined: $y \leq -2x + 5$.
- 8) **Choice B is correct.** (NC.8.F.1) The definition of a function requires that for each input value, there is exactly one corresponding output value. This ensures consistency and predictability.
- 9) **Choice B is correct.** (NC.8.F.2) Slope of p : -1 . Slope of q : -1.5 . Since $-1.5 < -1$, function q is more negative.
- 10) **The correct answer is 7.1.** (NC.8.NS.1) Since $7^2 = 49$ and $7.1^2 = 50.41$, we have $\sqrt{50}$ between 7.0 and 7.1, closer to 7.1. More precisely, $7.07^2 \approx 49.98 \approx 50$. To the nearest tenth, $\sqrt{50} \approx 7.1$.
- 11) **Choice D is correct.** (NC.8.G.5) Exterior angle equals the sum of remote interior angles: $55 + 64 = 119^\circ$.
- 12) **Choice B is correct.** (NC.8.G.6, NC.8.G.7) The diagonal is $d = \sqrt{70^2 + 24^2} = \sqrt{5476} = 74$ m. Walking along the length and width is $70 + 24 = 94$ m, so the diagonal is $94 - 74 = 20$ m shorter.
- 13) **Choice C is correct.** (NC.8.G.7) Expected repair cost = $0.1 \times 300 = \$30$. Since the warranty costs \$89, it costs more than the expected repair cost.
- 14) **Choice C is correct.** (NC.8.EE.2) A cube root asks what number cubed gives 100. Since $10^3 = 1000$, 10 is not the cube root of 100.
- 15) **Choice C is correct.** (NC.8.EE.4) Correct rule: multiply coefficients and add exponents. The student got $2 \times 4 = 8$ correct, but mistakenly multiplied $3 \times 4 = 12$ instead of adding $3 + 4 = 7$.
- 16) **Choice C is correct.** (NC.8.EE.1) Substitute $t = 3.5$: $d = 12(3.5) = 42$ miles. The proportional relationship scales with time.
- 17) **Choice A is correct.** (NC.8.EE.8) Substitute $x = 2$ into $4x - 3y = 5$: $8 - 3y = 5$, so $-3y = -3$ and $y = 1$. The solution is $(2, 1)$.
- 18) **Choice A is correct.** (NC.8.EE.8) Area = $(2x + 1)(x + 3) = 2x^2 + 6x + x + 3 = 2x^2 + 7x + 3$ m².
- 19) **The correct answer is $\frac{53}{90}$.** (NC.8.NS.1) Set $x = 0.5\bar{8} = 0.5888\dots$. Then $10x = 5.\bar{8}$ and $100x = 58.\bar{8}$. Subtracting: $90x = 53$, so $x = \frac{53}{90}$.
- 20) **The correct answer is 8.2.** (NC.8.NS.2) $8^2 = 64$ and $9^2 = 81$, so $\sqrt{68}$ is between 8 and 9. A closer estimate is about 8.246, which rounds to 8.2 to the nearest tenth.
- 21) **Choice B is correct.** (NC.8.F.3) $y = 10x - 6$ is in the form $y = mx + b$ with $m = 10$ and $b = -6$, making it linear. The others involve exponents, fractions with x , or exponential bases.
- 22) **The correct answer is B, D.** (NC.8.EE.3) B: $\frac{2.1 \times 10^7}{2.1 \times 10^5} = 10^2 = 100$. D: $\frac{8.3 \times 10^6}{8.3 \times 10^3} = 10^3 = 1,000$. A is false because $10^{-5} < 10^{-3}$. C is false because $10^{-2} \neq 10^2$. E is false because $5 \times 10^{-4} > 5 \times 10^{-6}$.
- 23) **The correct answer is 22.0.** (NC.8.NS.1) Circumference = $\pi d \approx 3.14 \times 7 = 21.98 \approx 22.0$ cm.
- 24) **Choice C is correct.** (NC.8.F.5) Proportional functions have form $y = mx$ (intercept = 0). Option C has intercept 1, so it is not proportional.
- 25) **Choice D is correct.** (NC.8.F.5) Option D shows increasing returns that diminish: steep early growth then gradual improvement. A is constant, B accelerates, C has a flat section.
- 26) **Choice B is correct.** (NC.8.G.3) Left means subtract from x ; up means add to y . The rule is $(x, y) \rightarrow (x - 5, y + 8)$.
- 27) **Choice C is correct.** (NC.8.G.8) $d = \sqrt{24^2 + 7^2} = \sqrt{576 + 49} = \sqrt{625} = 25$ units. (This is a 7-24-25 Pythagorean triple.)



Hi, Future Algebra Thinker!

◇ Grade 8 practice builds a bridge to high school mathematics through exponents, linear systems, functions, transformations, geometry, and data models. This high-stamina book gave you nine substantial Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** Every time you solved for an unknown or explained a relationship, you were building skills that future math will use again. ★

Bridge Skills

- **Use Variables:** Let letters stand for unknown values.
- **Balance Equations:** Keep both sides fair.
- **Read Graphs:** Connect points to meaning.
- **Compare Rates:** Look for constant relationships.

Grade 8 test-day tip: When you see a variable, say what it represents. That keeps algebra connected to the problem.

If you want to share something or ask a question, please email me at jay@testinar.com.

Jay Daie

Your Algebra Bridge Coach

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

Help your child excel in math with **9 full-length Grade 8 practice tests** designed to reflect real test formats and cover all key math standards.

With a wide variety of questions and real-world applications, this book builds the skills and confidence students need to achieve their best!



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Questions designed to cover essential Grade 8 math standards.



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Multiple-choice, short answer, and more to build well-rounded skills.



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Engaging problems that connect math to everyday life.



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Track improvement and build confidence with every test.



Build Skills & Boost Confidence

Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

- | | |
|---------------------------------------|----------------------------|
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| ✓ Linear Equations | ✓ Transformations |
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