

9

Connecticut

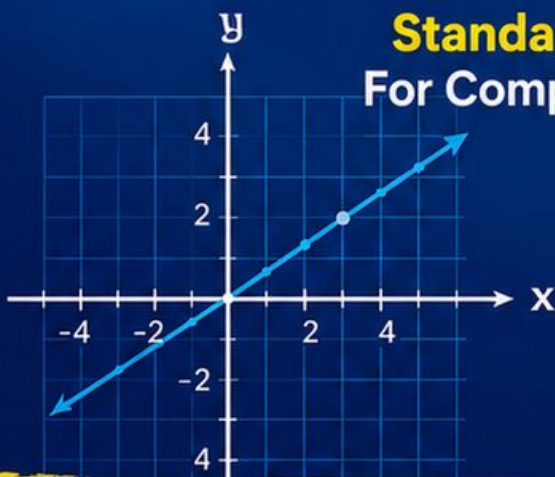
Smarter Balanced

Grade 8

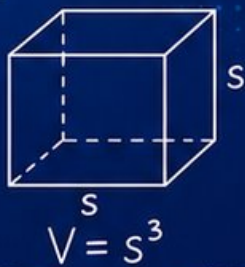
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



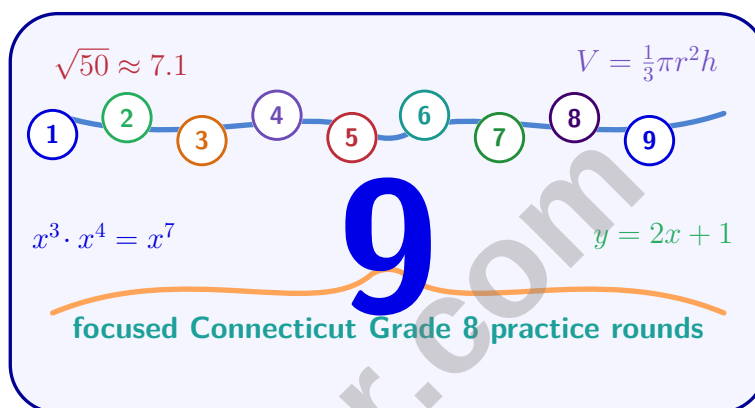
$$2x + 3y = 12$$
$$y = mx + b$$

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

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

9 Connecticut Smarter Balanced Grade 8 Math Practice Tests

Grade 8 Connecticut Practice for Graphs, Equations, Transformations, and Data Analysis



Nine complete 40-question Grade 8 Smarter Balanced 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, Connecticut Grade 8 Problem Solver!

Nine focused rounds for sharper Smarter Balanced math thinking

This book gives you nine full Grade 8 Smarter Balanced 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 Connecticut 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.

Connecticut 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 Smarter Balanced 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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1) Two points on a line are $(-3, 2)$ and $(3, -4)$. What is the slope?

☐ A. -1

☐ C. $-\frac{1}{6}$

☐ B. 1

☐ D. 6

2) When a figure is rotated 270° counterclockwise about the origin, the transformation rule is:

☐ A. $(x, y) \rightarrow (y, -x)$

☐ C. $(x, y) \rightarrow (-x, -y)$

☐ B. $(x, y) \rightarrow (-y, x)$

☐ D. $(x, y) \rightarrow (y, x)$

3) Solve for n : $-2(n - 4) = 10$

☐ A. $n = 1$

☐ C. $n = 9$

☐ B. $n = -9$

☐ D. $n = -1$

4) Which value does NOT satisfy $-3x + 4 < 7$?

☐ A. $x = 0$

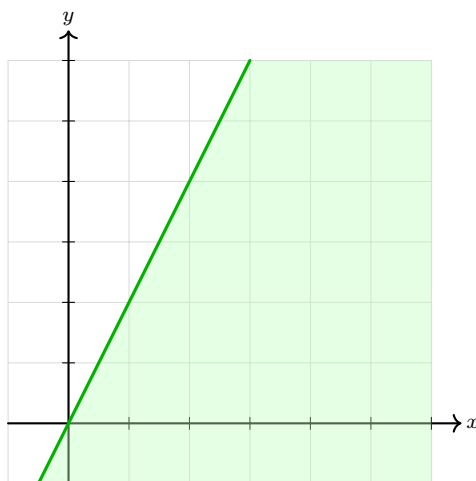
☐ C. $x = 2$

☐ B. $x = 1$

☐ D. $x = -2$



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5)

The graph shows which inequality?

☐ A. $y > 2x$

☐ C. $y \geq 2x$

☐ B. $y < 2x$

☐ D. $y \leq 2x$

6) A square tile has side length 5 cm. The diagonal is $5\sqrt{2}$ cm. What is the best estimate of the diagonal?

☐ A. 5.5 cm

☐ C. 7.1 cm

☐ B. 6.5 cm

☐ D. 10.0 cm

7) Which number is closest to $\sqrt{50}$?

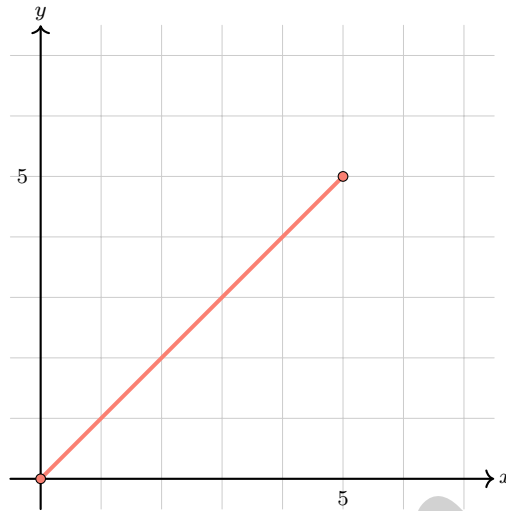
☐ A. 6

☐ C. 7.1

☐ B. 7

☐ D. 9





8)

The equation is:

☐ A. $y = \frac{1}{5}x$

☐ B. $y = 5x$

☐ C. $y = x$

☐ D. $y = x + 5$

9) What is the slope of a line that is perpendicular to the line $y = 2x + 5$?

☐ A. 2

☐ B. $\frac{1}{2}$

☐ C. $-\frac{1}{2}$

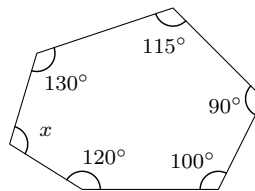
☐ D. -2

10) Determine how many solutions this system has:
$$\begin{cases} x - 3y = 6 \\ 2x - 6y = 12 \end{cases}$$
☐ A. No solution☐ B. Exactly one solution☐ C. Infinitely many solutions☐ D. Two solutions

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- 1) A student finds the slope of the line through (1, 3) and (4, 9) and gets the answer $\frac{3}{6} = \frac{1}{2}$. What is the student's error?

- ☐ A. Did not simplify the fraction correctly
- ☐ B. Forgot to use the slope formula
- ☐ C. Subtracted in the wrong order in the numerator
- ☐ D. Used the formula $\frac{x_2 - x_1}{y_2 - y_1}$ instead of $\frac{y_2 - y_1}{x_2 - x_1}$



2)

A hexagon has five known interior angles: 120° , 100° , 90° , 115° , 130° . What is the sixth angle?

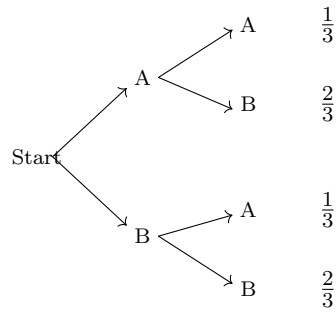
- ☐ A. 145°
- ☐ B. 155°
- ☐ C. 165°
- ☐ D. 175°

- 3) A museum's skylight is a square pyramid frame with a base side of 5 m and height 3 m. What is the volume of air enclosed by this pyramidal structure?

- ☐ A. 15 m^3
- ☐ B. 25 m^3
- ☐ C. 75 m^3
- ☐ D. 225 m^3



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4)

The tree diagram shows outcomes for spinning a spinner twice. Outcome A has probability $\frac{1}{3}$, and outcome B has probability $\frac{2}{3}$ on each spin. What is the probability of getting A then B?

- ☐ A. $\frac{2}{9}$
☐ B. $\frac{1}{3}$

- ☐ C. $\frac{4}{9}$
☐ D. $\frac{3}{9}$

5) A restaurant offers a choice of 5 main dishes and 3 side dishes. If you order one main and one side, how many different meals can you choose?

- ☐ A. $5 + 3 = 8$
☐ B. $5 \times 3 = 15$

- ☐ C. $5^3 = 125$
☐ D. $3 \times 3 = 9$

6) A researcher measures the marginal relative frequency of a category as $\frac{\text{cell}}{\text{row total}}$ instead of $\frac{\text{row total}}{\text{grand total}}$. What type of frequency did the researcher calculate?

- ☐ A. Marginal relative frequency (correct).
☐ B. Joint relative frequency.
☐ C. Row-conditional relative frequency.
☐ D. Column-conditional relative frequency.



1) If $5.7 \times 10^7 = 57,000$, what is the exponent?

☐ A. 3

☐ C. 5

☐ B. 2

☐ D. 4

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 ≈ 5 cm, SA ≈ 129 cm²

☐ C. Slant height ≈ 4 cm, SA ≈ 113 cm²

☐ B. Slant height ≈ 5 cm, SA ≈ 144 cm²

☐ D. Slant height ≈ 6 cm, SA ≈ 161 cm²

3) Which data scenario would MOST closely match a linear model $y = 0.5x + 15$?

☐ A. Bacteria population doubling every hour

☐ C. Height of a ball after it bounces (decreasing bounce heights)

☐ B. Water height in a tank filling at a constant rate

☐ D. Compound interest in a savings account

4) A runner trains at 6 miles per hour. Write the equation $d = kt$ for distance d (miles) and time t (hours). What is k ?

5) Simplify $\left(\frac{x}{y}\right)^2$ where $y \neq 0$.

☐ A. $\frac{2x}{2y}$

☐ C. $\frac{x^2}{y^2}$

☐ B. $\frac{x}{y^2}$

☐ D. $\frac{x^2}{y}$

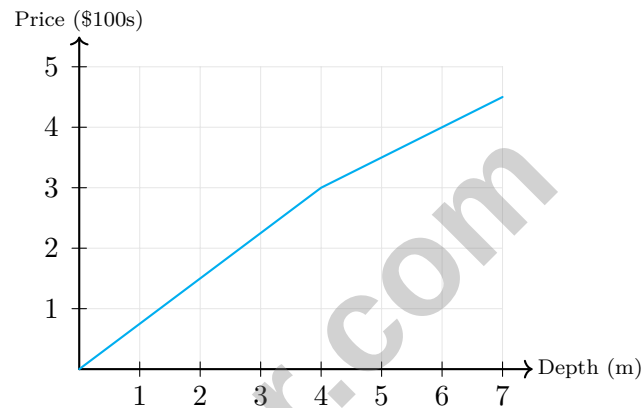


6) Which statement best explains why the table represents a linear function?

x	-2	-1	0	1
y	-5	-2	1	4

- ☐ A. The first differences are constant
☐ B. The equation is $y = x + 3$
☐ C. The y -values are all positive
☐ D. It is nonlinear because x includes negative values

7)



The graph shows well-drilling cost vs. depth. Why does the slope change at 4 meters depth?

- ☐ A. The drilling cost stays the same at all depths
☐ B. Different rock layers require different rates
☐ C. The drilling stops at 4 meters
☐ D. Cost actually decreases, shown by a negative slope

8) If a triangle is dilated by scale factor $\frac{1}{3}$ centered at the origin and the original triangle has area 45 square units, what is the area of the dilated triangle?

- ☐ A. 15 square units
☐ B. 5 square units
☐ C. 135 square units
☐ D. 45 square units



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Connecticut Smarter Balanced 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 Connecticut Smarter Balanced practice test.

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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (8.EE.B.5) Slope = $\frac{-4 - 2}{3 - (-3)} = \frac{-6}{6} = -1$.
- 2) **Choice A is correct.** (8.G.A.1) 270° counterclockwise equals 90° clockwise, using the rule $(x, y) \rightarrow (y, -x)$. Distractor B is 90° counterclockwise.
- 3) **Choice D is correct.** (8.EE.C.7) Distribute: $-2n + 8 = 10$. Subtract 8: $-2n = 2$. Divide by -2 : $n = -1$.
- 4) **Choice D is correct.** (8.EE.C.8b) Solving: $-3x < 3$, so $x > -1$. Testing: $x = -2$ gives $-3(-2) + 4 = 10 \not< 7$ (false). So $x = -2$ does not satisfy.
- 5) **Choice D is correct.** (8.EE.C.8b) SOLID line (includes boundary) and shading BELOW the line indicates $y \leq 2x$.
- 6) **Choice C is correct.** (8.NS.A.2) $5\sqrt{2} \approx 5 \times 1.41 = 7.05$ cm.
- 7) **Choice C is correct.** (8.EE.A.2) $7^2 = 49$ and $8^2 = 64$, so $\sqrt{50}$ is a little more than 7. Since $\sqrt{50} \approx 7.07$, it is closest to 7.1.
- 8) **Choice C is correct.** (8.EE.B.5) Slope $k = \frac{5}{5} = 1$. The line has a 45-degree angle, so $y = x$.
- 9) **Choice C is correct.** (8.EE.B.6) The slope of the given line is 2. The perpendicular slope is $-\frac{1}{2}$ (negative reciprocal).
- 10) **Choice C is correct.** (8.EE.C.8a) The second equation is exactly 2 times the first equation. They represent the same line, so the system has infinitely many solutions.
- 11) **Choice A is correct.** (8.EE.C.7) FOIL: $(x + 2)(x + 6) = x^2 + 6x + 2x + 12 = x^2 + 8x + 12$.
- 12) **Choice C is correct.** (8.F.A.1) Each barcode corresponds to a product, but the price can change multiple times, giving the barcode multiple price outputs. The other options satisfy the one-input-one-output rule.
- 13) **The correct answer is 66.67.** (8.EE.A.3) Divide: $\frac{8 \times 10^{-6}}{1.2 \times 10^{-7}} = \frac{8}{1.2} \times 10^1 = 6.67 \times 10^1 \approx 66.67$.
- 14) **Choice A is correct.** (8.F.B.5) The upward segment lasts 3 hours (0 to 3), and the downward segment also lasts 3 hours (5 to 8). Since the graph starts and ends at 0, the same height gained is later lost over the same amount of time, so the absolute values of the slopes are equal.
- 15) **The correct answer is $\frac{5}{11}$.** (8.NS.A.1) Let $x = 0.454545 \dots$. Then $100x = 45.454545 \dots$, so $99x = 45$ and $x = \frac{45}{99} = \frac{5}{11}$.
- 16) **Choice A is correct.** (8.G.A.3) Reflecting across the x -axis maps $(1, 2) \rightarrow (1, -2)$. Translating right 1 and up 1 gives $(2, -1)$, which is a vertex of the image. Checking the other vertices shows the same rule maps the whole rectangle correctly.
- 17) **Choice A is correct.** (8.G.A.5) Co-interior angles are supplementary: $(2x + 15) + (x + 45) = 180$, so $3x + 60 = 180$, giving $x = 40$.
- 18) **The correct answer is A, E.** (8.G.C.9) A is true because $V = 3.14(4^2)(10) = 502.4 \text{ cm}^3$. E is true because a cone's volume is one-third the volume of a cylinder with the same base and height. B is false because the sphere's volume is about 267.95 cm^3 , not the cylinder volume. C is false because the cone's volume with height 10 cm is about 167.47 cm^3 . D is false because a cylinder with height 6 cm has volume 301.44 cm^3 , which is greater than the sphere volume.
- 19) **Choice D is correct.** (8.G.B.7) Simple interest: $I = Prt = 1500 \times 0.04 \times 2 = \120 . Distractor A is 1-year interest; C is double (wrong time calc); D confuses principal.
- 20) **Choice C is correct.** (8.EE.A.1) $(2^5)^2 = 2^{5 \cdot 2} = 2^{10}$. The other choices do not simplify to 2^{10} .
- 21) **Choice D is correct.** (8.EE.A.4) Divide coefficients: $8 \div 2 = 4$. Subtract exponents: $10^{8-3} = 10^5$. Result: 4×10^5 .
- 22) **Choice C is correct.** (8.F.A.2) A grows at 50/hr. B grows at $(150 - 50)/2 = 50/\text{hr}$. Both equal.
- 23) **Choice B is correct.** (8.F.A.3) Constant second differences indicate a quadratic (degree-2 polynomial) function, which is nonlinear.
- 24) **Choice A is correct.** (8.F.B.4) Initial length is 10 cm (when $w = 0$). Change from 2 to 4 weights: length goes from 14 to 18 cm, a change of 4 cm for 2 weights, so slope is 2. Equation: $L = 2w + 10$.
- 25) **Choice B is correct.** (8.G.A.2) Comparing the two squares: ABCD (lower left on the grid) and EFGH (upper right) have identical side lengths and the same orientation. The vertices align: A is at (0,0) and E is at (4,3), indicating a translation 4 units right and 3 units up. Translation is a rigid motion that preserves all distances and angles, so no rotation or reflection is needed.
- 26) **Choice A is correct.** (8.G.B.6, 8.G.B.7) The diagonal is the hypotenuse of a right triangle with legs 8 and 6: $d^2 = 8^2 + 6^2 = 64 + 36 = 100$, so $d = 10$ m.



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

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Engaging problems that connect math to everyday life.



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Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

- | | |
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