

CONNECTICUT

Smarter Balanced

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS

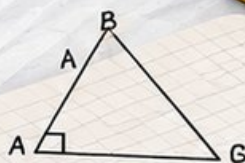


2 ONLINE
TESTS

**Standards Aligned
Problem Solving For**
Comprehensive Assessment Programs



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



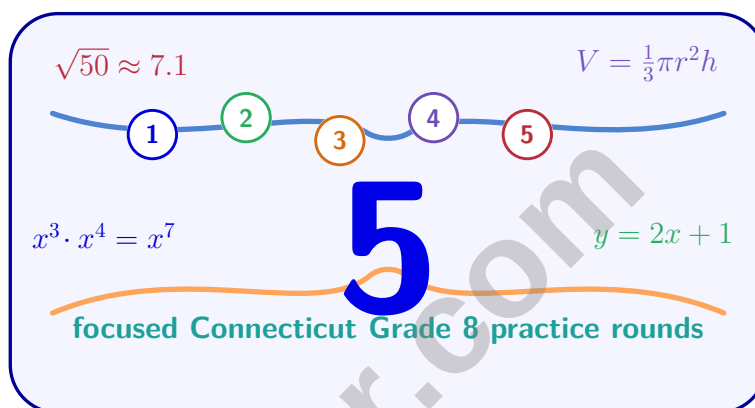
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 Connecticut Smarter Balanced Grade 8 Math Practice Tests

Clear Smarter Balanced Practice for Functions, Geometry, and Statistics



Five 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!

Five focused rounds for sharper Smarter Balanced math thinking

This book gives you five 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 five-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?

Five Smarter Balanced tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
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) Which statement about the table below is true?

	Debate	Science	Total
Math	36	84	120
English	48	72	120
Science	60	60	120
Total	144	216	360

- ☐ A. The relative frequency of Math students in the Debate club is $\frac{36}{144} = 0.25$.
 ☐ C. The marginal relative frequency of Debate is $\frac{144}{500} = 0.40$.
- ☐ B. The relative frequency of Debate club among Math students is $\frac{36}{360} \approx 0.10$.
 ☐ D. The joint relative frequency of Science and English is $\frac{84}{360} = 0.20$.
- 2) If $1.5 \times 10^4 = 15,000$, then $(1.5 \times 10^4) \times 10 = ?$
- ☐ A. 15×10^5
☐ C. 150,000
 ☐ B. 1.5×10^3
☐ D. 1.5×10^{40}
- 3) Savings comparison: Teen saves \$25 first week, \$30 second week, \$35 third week. Matches which pattern?
- ☐ A. $S(w) = 20 + 5w$ (linear)
 ☐ C. $S(w) = w^2 + 24$ (quadratic)
 ☐ B. $S(w) = 25w$ (linear)
 ☐ D. $S(w) = 25 \cdot 2^{w-1}$ (exponential)
- 4) A cell phone plan costs \$20 per month plus \$0.10 per text message. If cost is graphed against number of texts sent (x-axis texts, y-axis cost in \$), what is the slope?
- ☐ A. \$20 per text
 ☐ C. 20 texts per dollar
 ☐ B. \$20.10 per text
 ☐ D. \$0.10 per text



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- 5) A concert venue sells adult tickets for \$15 and student tickets for \$8. If 120 total tickets were sold for \$1,520, how many student tickets were sold?

☐ A. 40 ☐ C. 80
☐ B. 60 ☐ D. 100

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

- 7) The table below shows values of function f . What is $f(2)$?

x	0	1	2	3
$f(x)$	5	7	9	11

☐ A. 7 ☐ C. 11
☐ B. 9 ☐ D. 5

- 8) Which function is NOT proportional (i.e., does not pass through the origin)?

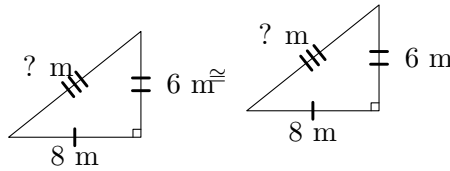
☐ A. $y = 3x$ ☐ C. $y = 2x + 1$
☐ B. $y = 5x$ ☐ D. $y = \frac{1}{2}x$

- 9) A student's test score shows: starts at 60, increases to 90 by question 5, then stays at 90 for questions 6-10, where 90 is the maximum possible score. Which is true?

☐ A. The student answered 30 consecutive questions correctly ☐ C. The student's score increased from question 5 to 10
☐ B. The rate of improvement was constant throughout ☐ D. The student improved in the first half but was already at the ceiling in the second half



- 10) 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
- 11) A segment from $(0,0)$ to $(9,12)$ is dilated by scale factor $\frac{2}{3}$ centered at the origin. What is the length of the dilated segment?
- ☐ A. 20 units ☐ C. 15 units
☐ B. 12 units ☐ D. 10 units
- 12) Two parallel lines are cut by a transversal. If one angle is $(6y + 12)^\circ$ and its corresponding angle is $(3y + 51)^\circ$, find y .
- ☐ A. 13 ☐ C. 17
☐ B. 15 ☐ D. 19
- 13) A right triangle has legs of $\sqrt{12}$ and $\sqrt{13}$. What is the hypotenuse in simplified radical form?
- ☐ A. $\sqrt{20}$ ☐ C. $\sqrt{5}$
☐ B. 5 ☐ D. 25



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1) If a data set has mean = 50 and MAD = 0, which statement is true?

- ☐ A. All values equal 50 ☐ C. There are no values equal to 50
☐ B. The data is very spread out ☐ D. The smallest value is 50

2) What is $\frac{3.6 \times 10^6}{1.2 \times 10^2}$?

- ☐ A. 3×10^8 ☐ C. 0.3×10^4
☐ B. 2.4×10^4 ☐ D. 3×10^4

3) Which table represents a NONLINEAR function?

x	0	1	2	3
y	1	2	4	8

- ☐ A. No, y increases ☐ C. Yes, the y -values are doubling
☐ B. Yes, the first differences are not constant ☐ D. No, the x -values are equally spaced

4) Runner P : $d(t) = 8t$ mph. Runner Q at $t = 0$: 2 mi, $t = 3$: 27 mi. Faster?

- ☐ A. Runner P ☐ C. Both same.
☐ B. Runner Q ☐ D. Cannot be determined.

5) A company's profit increases by \$500 for every unit sold. What is the slope of the profit-versus-units-sold line?

- ☐ A. $\frac{1}{500}$ per unit ☐ C. 500 units
☐ B. \$1000 per unit ☐ D. \$500 per unit



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6) To solve the system $y = 2x - 3$ and $y = -x + 6$, which method is most efficient?

☐ A. Elimination

☐ C. Substitution

☐ B. Graphing

☐ D. Guess and check

7) If $f(x) = 10 - x$, which is greater: $f(2)$ or $f(5)$?

☐ A. $f(2)$ is greater

☐ C. They are equal

☐ B. $f(5)$ is greater

☐ D. Cannot be determined

8) For which system do the two equations represent parallel lines?

☐ A. $y = 2x + 1$ and $y = 2x - 3$

☐ C. $y = 2x + 1$ and $y = x + 3$

☐ B. $y = 2x + 1$ and $y = -\frac{1}{2}x + 1$

☐ D. $y = 2x + 1$ and $y = 2x + 1$

9) A student expands $(x + 2)(x + 3)$ and writes $x^2 + 5x + 6$. Is this correct?

☐ A. Yes, it is correct.

☐ C. No; the middle term is wrong.

☐ B. No; the constant term is wrong.

☐ D. No; all terms are wrong.

10) If $3^a \cdot 3^5 = 3^{12}$, what is the value of a ?



- 1) A restaurant offers 5 types of bread, 4 types of cheese, and 3 types of meat. How many different sandwich combinations are possible if you pick one of each?

☐ A. 12 ☐ C. 35
☐ B. 20 ☐ D. 60

- 2) Simplify $7^{-4} \cdot 7^6$.

☐ A. 7^{-2} ☐ C. 7^3
☐ B. 7^{-10} ☐ D. 7^2

- 3) Explain why 10^5 is 100 times greater than 10^3 . Use exponents in your reasoning.

- 4) Between which two consecutive integers does $\sqrt{77}$ lie?

☐ A. 7 and 8 ☐ C. 9 and 10
☐ B. 10 and 11 ☐ D. 8 and 9

- 5) $\frac{6 \times 10^5}{2 \times 10^{10}} = ?$

☐ A. 12×10^{-5} ☐ C. 3×10^5
☐ B. 8×10^{-5} ☐ D. 3×10^{-5}

- 6) A recipe calls for 3 cups of flour per batch of cookies. How many batches can be made with 12 cups of flour? (Assume a proportional relationship.)

☐ A. 2 batches ☐ C. 4 batches
☐ B. 3 batches ☐ D. 6 batches



7) $f(x) = \frac{1}{2}x + 3$ and $g(x) = \frac{1}{2}x - 2$. Which is correct?

☐ A. f has greater slope.

☐ B. g has greater slope.

☐ C. Equal slopes, different intercepts.

☐ D. Functions identical.

8) Find the value of $\sqrt{144}$.

9) Which equation represents a LINEAR function?

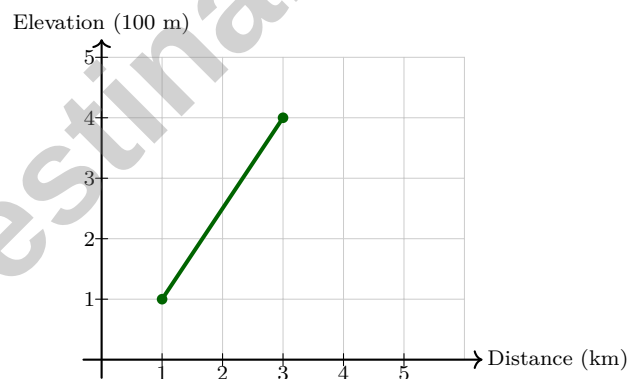
☐ A. $y = 2^x$

☐ B. $y = \frac{5}{x-2}$

☐ C. $y = |x| + 1$

☐ D. $y = -3x + 4$

10) The graph shows elevation change during a hike.



What is the slope of the line?

☐ A. $\frac{3}{4}$

☐ B. $\frac{2}{3}$

☐ C. $\frac{3}{2}$

☐ D. 2



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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.SP.A.4)** A is true: the column-conditional frequency of Math among Debate is $\frac{36}{144} = 0.25$. B uses the grand total instead of the Math row total. C uses the wrong denominator, and D uses the wrong cell count.
- 2) **Choice C is correct.** **(8.EE.A.4)** $1.5 \times 10^4 \times 10 = 1.5 \times 10^{4+1} = 1.5 \times 10^5 = 150,000$.
- 3) **Choice A is correct.** **(8.F.A.2)** Week 1: $20 + 5(1) = 25$. Week 2: $20 + 5(2) = 30$. Week 3: $20 + 5(3) = 35$. Constant difference of 5 per week indicates linear with slope 5.
- 4) **Choice D is correct.** **(8.EE.B.5)** The slope is the rate of change of cost per additional text, which is \$0.10 per text. The \$20 is the y-intercept (fixed cost).
- 5) **Choice A is correct.** **(8.EE.C.8c)** Let a = adult tickets and s = student tickets. Then $a + s = 120$ and $15a + 8s = 1520$. Substitute $a = 120 - s$: $15(120 - s) + 8s = 1520$, so $1800 - 7s = 1520$. Then $7s = 280$, so $s = 40$.
- 6) **The correct answer is (5, 3).** **(8.EE.C.8a)** Add the two equations to eliminate y : $(x + y) + (x - y) = 8 + 2$, so $2x = 10$, giving $x = 5$. Substitute into the first equation: $5 + y = 8$, so $y = 3$.
- 7) **Choice B is correct.** **(8.F.A.1)** Locate $x = 2$ in the table; the corresponding $f(x)$ value is 9.
- 8) **Choice C is correct.** **(8.F.B.4)** Proportional functions have form $y = mx$ (intercept = 0). Option C has intercept 1, so it is not proportional.
- 9) **Choice D is correct.** **(8.F.B.5)** The score improves (60 to 90) in the first 5 questions, then plateaus at 90 for the rest. This indicates hitting the maximum possible score. C is false (no increase after Q5), A is unclear/false, B is false (two different rates).
- 10) **Choice C is correct.** **(8.G.A.2)** 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.
- 11) **Choice D is correct.** **(8.G.A.3)** Original length: $\sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$. Dilated: $15 \times \frac{2}{3} = 10$.
- 12) **Choice A is correct.** **(8.G.A.5)** Corresponding angles are equal: $6y + 12 = 3y + 51$, so $3y = 39$ and $y = 13$.
- 13) **Choice B is correct.** **(8.G.B.6, 8.G.B.7)** From $(\sqrt{12})^2 + (\sqrt{13})^2 = c^2$, we get $12 + 13 = 25$, so $c = \sqrt{25} = 5$.
- 14) **Choice A is correct.** **(8.G.B.8)** $d = \sqrt{(2 - (-4))^2 + (7 - (-1))^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
- 15) **Choice A is correct.** **(8.G.B.7)** Complementary angles sum to 90° . So $B = 90 - 38 = 52^\circ$.
- 16) **Choice C is correct.** **(8.G.C.9)** If height triples, volume triples (linear relationship with h in $V = \frac{1}{3}Bh$). New volume: $3 \times 240 = 720 \text{ ft}^3$.
- 17) **Choice A is correct.** **(8.G.B.7)** Large rectangle area = $20 \times 8 = 160 \text{ m}^2$. Small rectangle area = $6 \times 3 = 18 \text{ m}^2$. Remaining = $160 - 18 = 142 \text{ m}^2$.
- 18) **Choice B is correct.** **(8.G.A.5)** A hexagon's interior angles add to 720° . The known angles add to $68 + 118 + 102 + 150 + 106 = 544^\circ$, so the sixth angle is $720 - 544 = 176^\circ$.
- 19) **The correct answer is A,D.** **(8.EE.B.5)** The line goes through (0,0) and (8,4), so the slope and constant of proportionality are $\frac{4}{8} = 0.5$. A point on the line must have $y = 0.5x$; when $x = 6$, $y = 3$, so (6, 3) is on the line.
- 20) **Choice B is correct.** **(8.SP.A.1)** 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.
- 21) **Choice B is correct.** **(8.G.B.7)** Prime: 2, 3, 5, 7. Even: 2, 4, 6, 8, 10. Prime OR even: 2, 3, 4, 5, 6, 7, 8, 10 = 8 numbers. Note: 2 is both prime and even, counted once. $P = \frac{8}{10} = \frac{4}{5}$.
- 22) **Choice B is correct.** **(8.EE.C.7b)** Each of the 4 morning branches splits into 3 afternoon branches: $4 \times 3 = 12$ final outcomes.
- 23) **The correct answer is 100.** **(8.EE.C.7)** Substitute $x = 1$: $(1 + 9)^2 = 100$.
- 24) **Choice D is correct.** **(8.G.B.8)** An outlier is far from the mean, adding a large absolute deviation. This increases the sum of deviations, which increases the average (MAD).
- 25) **Choice B is correct.** **(8.SP.A.2)** A point far from the line is an outlier with a large residual. It suggests an unusual circumstance—perhaps the student was ill, didn't study the right material, or a data error occurred.



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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 5 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.

Jay Daie

Your Persistence Coach

Practice Today. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 full-length Grade 8 Math** practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, strengthening problem-solving abilities, and achieving success on test day!



WHAT'S INSIDE?



Standards-Aligned Practice

Questions designed to cover essential Grade 8 math standards.



Variety of Question Types

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



Real-World Applications

Engaging problems that connect math to everyday life.



Step-by-Step Progress

Track improvement and build confidence with every test.

COVERS ALL ESSENTIAL TOPICS

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

5
PRINTED
TESTS



2 ONLINE
TESTS



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