

SOUTH DAKOTA

Smarter Balanced

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



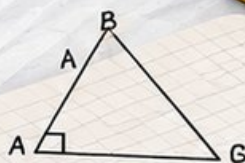
2

 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.



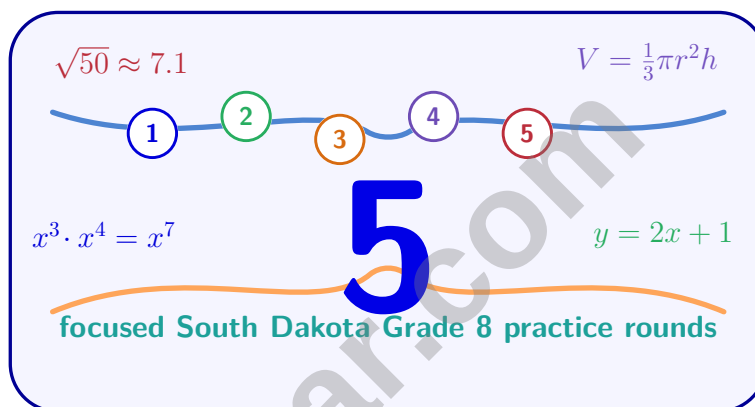
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 South Dakota Smarter Balanced Grade 8 Math Practice Tests

Clear Smarter Balanced Prep for Algebra, Geometry, and Data Analysis



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, South Dakota 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 South Dakota 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.

South Dakota 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.

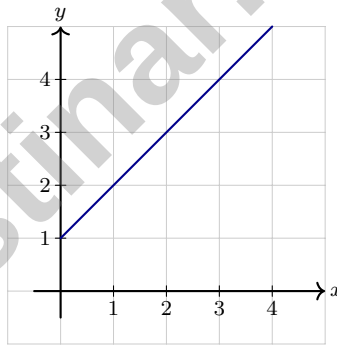


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& answers

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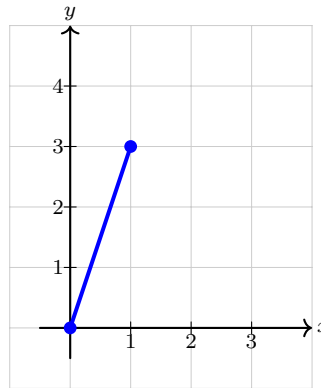
- 1) An angle's measure is 8° more than its supplement. Find the angle's measure.
- ☐ A. 86° ☐ C. 94°
☐ B. 88° ☐ D. 96°
- 2) $\frac{1.2 \times 10^4}{4 \times 10^6} = ?$
- ☐ A. 0.3×10^{-2} ☐ C. 3.2×10^{-2}
☐ B. 5×10^{-3} ☐ D. 3×10^{-3}
- 3) Line A passes through $(0,0)$ and $(3,6)$. Line B passes through $(0,1)$ and $(2,7)$. Which line increases faster?
- ☐ A. Line A ☐ C. Both increase equally.
☐ B. Line B ☐ D. Cannot determine.
- 4) Which graph represents a LINEAR function?



- ☐ A. No, the relationship is not a function ☐ C. No, the slope is positive
☐ B. Yes, the graph is a straight line ☐ D. Yes, it passes through the origin



5) What is the slope of the line shown?



☐ A. 2

☐ B. $\frac{1}{3}$

☐ C. 3

☐ D. $\frac{3}{2}$

6) Solve the system $\begin{cases} y = 2x \\ x + y = 9 \end{cases}$ by substitution.

7) A restaurant has 50 tables. Small tables seat 2 people; large tables seat 4 people. To seat at least 160 people, how many large tables are needed at minimum?

☐ A. 20

☐ B. 25

☐ C. 30

☐ D. 35



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8) If $g(x) = x + 7$, what is $g(2)$?

☐ A. 5

☐ C. 10

☐ B. 9

☐ D. 14

9) A music streaming service charges \$8 for premium features plus \$12 per month for access. Which equation represents the total cost T for m months of service?

☐ A. $T = 12m + 8$

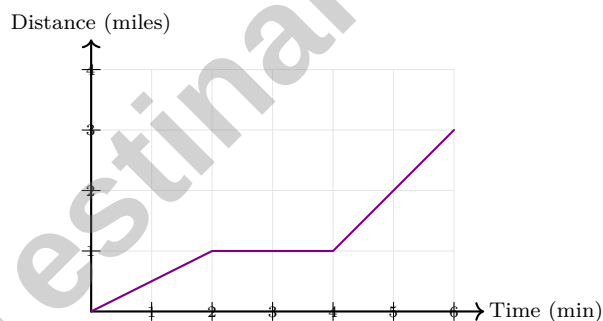
☐ C. $T = 20m$

☐ B. $T = 8m + 12$

☐ D. $T = 8m - 12$

10) Evaluate $(x + 9)^2$ when $x = 1$.

11)



A runner travels 1 mile in 2 minutes, stops for 2 minutes, then runs 2 more miles in 2 minutes. What is the average speed over the whole journey?

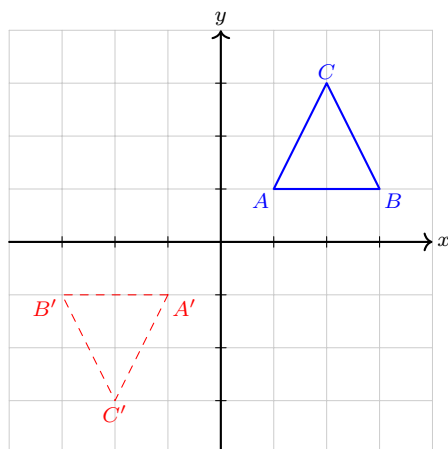
☐ A. 0.75 miles/min

☐ C. 1 mile/min

☐ B. 0.5 miles/min

☐ D. 1.5 miles/min





1)

The blue triangle is the pre-image and the red triangle is the image. Which transformation maps the blue triangle to the red triangle?

- ☐ A. Reflection across the x -axis ☐ C. Rotation 180° about the origin
☐ B. Translation left 2, down 2 ☐ D. Dilation by scale factor 2

2) Solve for x : $x^3 = 343$

3) $(2.1 \times 10^4) \times (3 \times 10^2) = ?$

- ☐ A. 5.1×10^6 ☐ C. 0.63×10^6
☐ B. 5.1×10^2 ☐ D. 6.3×10^6



- 4) A proportional relationship passes through $(0, 0)$ and $(3, 12)$. What is the constant of proportionality k ? (Give your answer as a simplified fraction or decimal.)

- 5) f passes through $(2, 5)$ and $(4, 1)$. $g(x) = -x + 8$. Which has a more negative slope?

- ☐ A. $f(x)$ ☐ C. Both equal.
☐ B. $g(x)$ ☐ D. Not comparable.

- 6) The function $y = 2 - 5x$ is linear. What are its slope and y -intercept?

- ☐ A. Slope = -5 , y -intercept = -2 ☐ C. Slope = -5 , y -intercept = 2
☐ B. Slope = 2 , y -intercept = -5 ☐ D. Slope = 5 , y -intercept = 2

- 7) A scientist measures bacterial growth. At time $t = 0$ min, there are 100 bacteria. At $t = 5$ min, there are 300 bacteria. What is the rate of change (slope)?

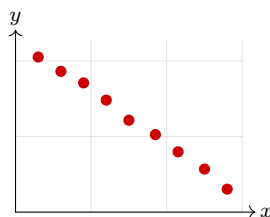
- ☐ A. 40 bacteria per minute ☐ C. 60 bacteria per minute
☐ B. 200 bacteria per minute ☐ D. 20 bacteria per minute

- 8) A river flows at 3 mph. A boat travels 4 hours downstream and 6 hours upstream for the same distance. What is the boat's speed in still water?

- ☐ A. 10 mph ☐ C. 15 mph
☐ B. 12 mph ☐ D. 18 mph



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1)

A scatter plot shows a clear downward trend from upper left to lower right. The points cluster tightly around the trend line. Which conclusion is correct?

- ☐ A. As one variable increases, the other tends to increase ☐ C. As one variable increases, the other tends to decrease
☐ B. This is a weak negative relationship ☐ D. The relationship is curved, not linear

2) Simplify $\frac{m^8}{m^5} \cdot m^2$.

- ☐ A. m^{15} ☐ C. m^{13}
☐ B. m^1 ☐ D. m^5

3) If $x^2 = 144$, what is the positive value of x ?

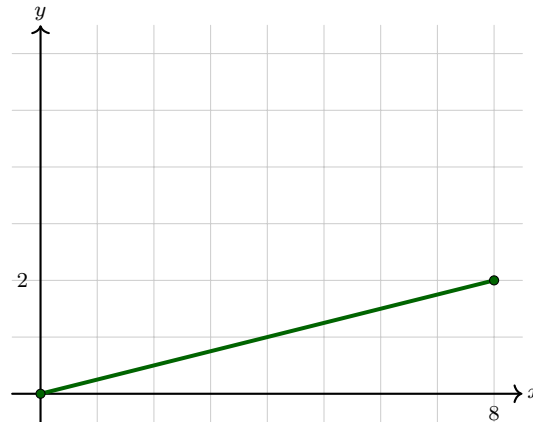
- ☐ A. 11 ☐ C. 13
☐ B. 14 ☐ D. 12

4) $(5.2 \times 10^6) - (1.5 \times 10^6) = ?$

- ☐ A. 0.37×10^6 ☐ C. 3.7×10^0
☐ B. 6.7×10^6 ☐ D. 3.7×10^6



5)



The constant of proportionality is:

☐ A. 4

☐ C. 0.25

☐ B. 2

☐ D. 8

- 6) Temperature functions: Oven $T_{\text{oven}}(m) = 15m + 70$ (degrees, starting at 70). Freezer T_{freeze} shown in table: $(0, -5)$, $(2, -15)$, $(4, -25)$. At 10 minutes, which is warmer?

m	0	2	4
T_{freeze}	-5	-15	-25

☐ A. Oven is warmer

☐ C. Same temperature

☐ B. Freezer is warmer

☐ D. Cannot be determined

- 7) A line passes through $(1, 3)$ and $(3, 7)$. Is this a linear relationship?

☐ A. No, the slope is not 1

☐ C. Yes, a line is always linear

☐ B. No, because you need more than two points

☐ D. Yes, only if the slope is positive


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South Dakota 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 South Dakota Smarter Balanced practice test.

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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice C is correct.** (8.G.7) Let the angle be x . Its supplement is $180 - x$. So $x = (180 - x) + 8 \Rightarrow x = 188 - x \Rightarrow 2x = 188 \Rightarrow x = 94^\circ$.
- 2) **Choice D is correct.** (8.EE.4) Divide coefficients: $1.2 \div 4 = 0.3 = 3 \times 10^{-1}$. Subtract exponents: $10^{4-6} = 10^{-2}$. Combine: $3 \times 10^{-1} \times 10^{-2} = 3 \times 10^{-3}$.
- 3) **Choice B is correct.** (8.F.2) Slope of A: $(6 - 0)/(3 - 0) = 2$. Slope of B: $(7 - 1)/(2 - 0) = 3$. Since $3 > 2$, Line B increases faster.
- 4) **Choice B is correct.** (8.F.3) A linear function is represented by a straight line on a coordinate plane. This graph shows a straight line, so the function is linear.
- 5) **Choice C is correct.** (8.EE.8) The line passes through $(0, 0)$ and $(1, 3)$. Rise is 3 for every 1 unit right. The slope is $\frac{\text{rise}}{\text{run}} = \frac{3}{1} = 3$.
- 6) **The correct answer is $(3, 6)$.** (8.EE.8) Substitute $y = 2x$ into $x + y = 9$: $x + 2x = 9$, so $3x = 9$, giving $x = 3$. Then $y = 2(3) = 6$.
- 7) **Choice C is correct.** (8.EE.7) Let l = large tables, so $50 - l$ tables are small. The seating capacity is $4l + 2(50 - l) = 100 + 2l$. Solve $100 + 2l \geq 160$, giving $2l \geq 60$ and $l \geq 30$.
- 8) **Choice B is correct.** (8.F.2) Substitute $x = 2$: $g(2) = 2 + 7 = 9$.
- 9) **Choice A is correct.** (8.F.4) One-time premium feature fee is \$8 (intercept). Monthly service cost is \$12 (slope). Total is $T = 12m + 8$.
- 10) **The correct answer is 100.** (8.EE.7) Substitute $x = 1$: $(1 + 9)^2 = 100$.
- 11) **Choice B is correct.** (8.F.5) Total distance = 3 miles. Total time = 6 minutes. Average speed = $3 \div 6 = 0.5$ miles/min. The flat segment adds time but no distance.
- 12) **Choice A is correct.** (8.G.2) For quadrilaterals, having two equal angles is not sufficient to prove congruence. Many quadrilaterals can share two angles but have different side lengths and shapes. Congruence requires all corresponding sides and angles to be equal.
- 13) **Choice D is correct.** (8.G.5) Corresponding angles are equal: $5x - 10 = 3x + 50$, so $2x = 60$ and $x = 30$.
- 14) **Choice B is correct.** (8.G.6, 8.G.7) The rope is the hypotenuse. Using $a^2 + b^2 = c^2$: $60^2 + 25^2 = 3600 + 625 = 4225$, so $c = 65$ feet (scaled 5-12-13 triple).
- 15) **Choice B is correct.** (8.G.8) $d = \sqrt{20^2 + 21^2} = \sqrt{400 + 441} = \sqrt{841} = 29$. (This is a 20-21-29 Pythagorean triple.)
- 16) **Choice C is correct.** (8.G.9) Base: $B = \frac{1}{2} \times 5 \times 12 = 30 \text{ in}^2$. Volume: $V = \frac{1}{3} \times 30 \times 4 = 40 \text{ in}^3$.
- 17) **Choice B is correct.** (8.G.5) The sum of interior angles in a quadrilateral is 360° . So $D = 360 - 85 - 95 - 100 = 80^\circ$.
- 18) **Choice D is correct.** (8.SP.1) At low doses, effectiveness increases sharply; at high doses, the increase levels off. This represents a nonlinear (logarithmic or power) relationship.
- 19) **Choice C is correct.** (8.SP.3) Dividing a cell by its row total is the definition of row-conditional frequency. The researcher either mislabeled their calculation or confused marginal (row total / grand total) with conditional (cell / row total).
- 20) **Choice D is correct.** (8.G.8) If $MAD = 0$, every value must equal the mean exactly, which happens only when all values are the same.
- 21) **Choice B is correct.** (8.EE.5) Seat 1: 8 choices. Seat 2: 7 remaining. Seat 3: 6 remaining. Using permutation notation: $\frac{8!}{5!} = 8 \times 7 \times 6 = 336$.
- 22) **The correct answer is A,D.** (8.EE.5) Line 1: $k = \frac{6}{4} = 1.5$, so $y = 1.5x$ (\$1.50/lb). Line 2: $k = \frac{12}{6} = 2$, so $y = 2x$ (\$2.00/lb). A is correct (Line 1 equation and price). D is correct (Line 2 has greater slope: $2 > 1.5$). C is wrong (Line 2 is steeper, not Line 1). B is correct but not a correct pair; E is subjective (worse deal, not better). Answer: A and D.
- 23) **Choice B is correct.** (8.G.3) Reflection across the y -axis negates the x -coordinate while keeping y the same: $(x, y) \rightarrow (-x, y)$.
- 24) **Choice D is correct.** (8.SP.2) A negative trend shows that warmer months have lower heating costs, a natural relationship that does not imply causation.
- 25) **Choice A is correct.** (8.G.4) From $X : Y = 3 : 4$, side in Y is $6 \times \frac{4}{3} = 8$ cm. From $Y : Z = 4 : 7$, side in Z is $8 \times \frac{7}{4} = 14$ cm. Verify: composite ratio $X : Z = \frac{3}{4} \times \frac{4}{7} \times 6 = \frac{3 \times 7 \times 6 \times 7}{3} = 14$ cm.



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.