

South Dakota

Smarter Balanced

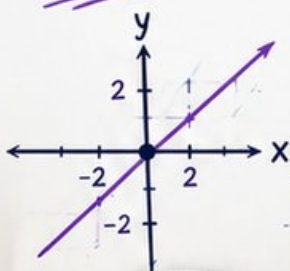
GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

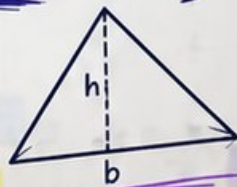
$$y = mx + b$$



**BUILD
CONFIDENCE.
SHARPEN SKILLS.
ACE YOUR
EXAM!**

Practice
Today
Succeed
Tomorrow!

$$A = \frac{1}{2}bh$$



7 PRINTED
TESTS



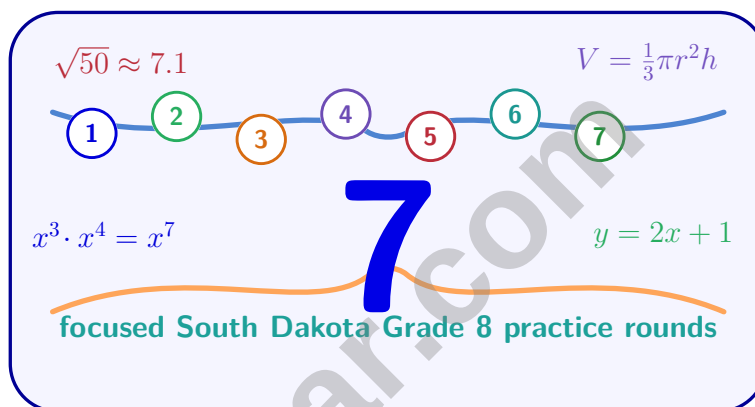
2 ONLINE
TESTS



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

7 South Dakota Smarter Balanced Grade 8 Math Practice Tests

Seven Smarter Balanced Rounds for Standards-Aligned Grade 8 Preparation



Seven 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!

Seven focused rounds for sharper Smarter Balanced math thinking

This book gives you seven 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 seven-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?

Seven Smarter Balanced tests, 280 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.
Test 7	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

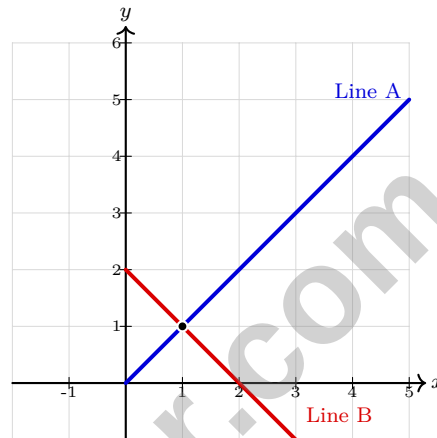
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- 1) A shape consists of a large triangle (base 16 ft, height 10 ft) with a smaller triangle (base 8 ft, height 5 ft) cut out from its center. What is the remaining area?

- ☐ A. 30 ft^2 ☐ C. 60 ft^2
☐ B. 40 ft^2 ☐ D. 80 ft^2

- 2) Use the graph below to solve the system.



- ☐ A. $(0, 0)$ ☐ C. $(1, 1)$
☐ B. $(2, 2)$ ☐ D. $(3, 3)$

- 3) Which of the following is a real-world function?

- ☐ A. A person and every address they have lived at. ☐ C. A person and the cars they have ever owned.
☐ B. A student's student ID and their grade in math class. ☐ D. A website URL and every person who has visited it.



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- 4) Solve for x : $3(x + 2) - 5 = x + 7$. Show all steps and verify your solution.

- 5) What are the coordinates of the image of point $(5, 0)$ after a reflection across the line $y = -x$?

☐ A. $(0, -5)$
☐ C. $(5, 0)$
☐ B. $(-5, 0)$
☐ D. $(0, 5)$

- 6) Pyramid A has dimensions: base edge 4 cm, height 6 cm. Pyramid B has all linear dimensions scaled by a factor of $\frac{3}{2}$. How does the volume of Pyramid B compare to Pyramid A?

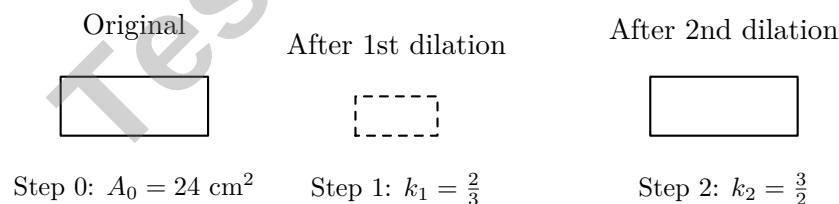
☐ A. $\frac{3}{2}$ times larger

☐ C. $\frac{27}{8}$ times larger

☐ B. $\frac{9}{4}$ times larger

☐ D. 3 times larger

- 7) A rectangle undergoes two successive dilations: first by scale factor $\frac{2}{3}$, then by scale factor $\frac{3}{2}$. If the original rectangle has area 24 cm^2 , what is the final area?


☐ A. 24 cm^2
☐ C. 32 cm^2
☐ B. 16 cm^2
☐ D. 54 cm^2


- 8) To determine the solution region of an inequality, you can use a test point. Which is the most efficient test point to select?
- ☐ A. A point on the boundary line ☐ C. Any point with negative coordinates
- ☐ B. The origin (0,0), provided it is not on the boundary ☐ D. A point in Quadrant III
- 9) Rectangle MNOP has length 15 cm and width 8 cm. Rectangle M'N'O'P' is congruent to MNOP. Which of the following is NOT a possible pair of dimensions for M'N'O'P'?
- ☐ A. Length 15 cm, width 8 cm ☐ C. Length 16 cm, width 8 cm
- ☐ B. Length 8 cm, width 15 cm ☐ D. Length 15 cm, width 8 cm (rotated)
- 10) A right triangle has legs of $\sqrt{7}$ and 3. What is the hypotenuse?
- ☐ A. $\sqrt{16}$ ☐ C. $\sqrt{10}$
- ☐ B. 4 ☐ D. 10
- 11) A cone has volume $150\pi \text{ cm}^3$ and radius 5 cm. What is its height?
- ☐ A. 6 cm ☐ C. 12 cm
- ☐ B. 9 cm ☐ D. 18 cm



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1) If $h(x) = 3x$, what is $h(-2)$?

☐ A. -6

☐ C. -2

☐ B. 6

☐ D. 3

2) Which line passes through the origin and has slope 3?

☐ A. $y = 3x - 3$

☐ C. $y = 3x + 3$

☐ B. $y = -3x$

☐ D. $y = 3x$

3) Look at the table of values for the equation $y = 2x + 1$:

x	y
1	3
2	5
?	9

What value of x produces $y = 9$?

☐ A. $x = 3$

☐ C. $x = 8$

☐ B. $x = 5$

☐ D. $x = 4$

4) A dust particle has a mass of 2×10^{-8} kg. If 500 such particles are stacked, what is the total mass in scientific notation?



5) Which is the complete factorization of $6x + 9$?

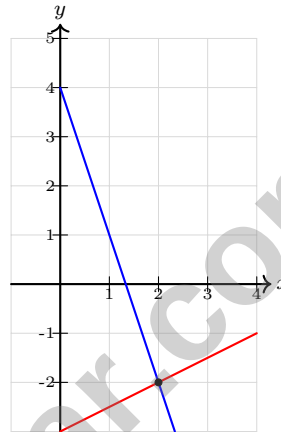
☐ A. $3(2x + 3)$

☐ C. $9(x + 1)$

☐ B. $6x(1 + \frac{9}{6})$

☐ D. $2x(3 + \frac{9}{2})$

6) For the system $\begin{cases} y = -3x + 4 \\ y = \frac{1}{2}x - 3 \end{cases}$, which graph correctly shows the intersection?


☐ A. The lines intersect at $(0, 4)$
☐ C. The lines intersect at $(2, -2)$
☐ B. The lines do not intersect (parallel)

☐ D. The lines intersect at $(1, 1)$

7) 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.


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1) A cylindrical storage tank has a radius of 2.5 m and height of 4 m. What is the total surface area (including top and bottom)? Use $\pi \approx 3.14$.

☐ A. 62.8 m^2

☐ C. 102.05 m^2

☐ B. 82.25 m^2

☐ D. 128.1 m^2

2) A data set with 10 values has $\text{MAD} = 0$, and all values are 100. If one value changes from 100 to 120, what is the new MAD?

☐ A. 0

☐ C. 3.6

☐ B. 2

☐ D. Cannot be determined

3) If two dice are rolled, what is the probability of getting at least one 4?

☐ A. $\frac{1}{6}$

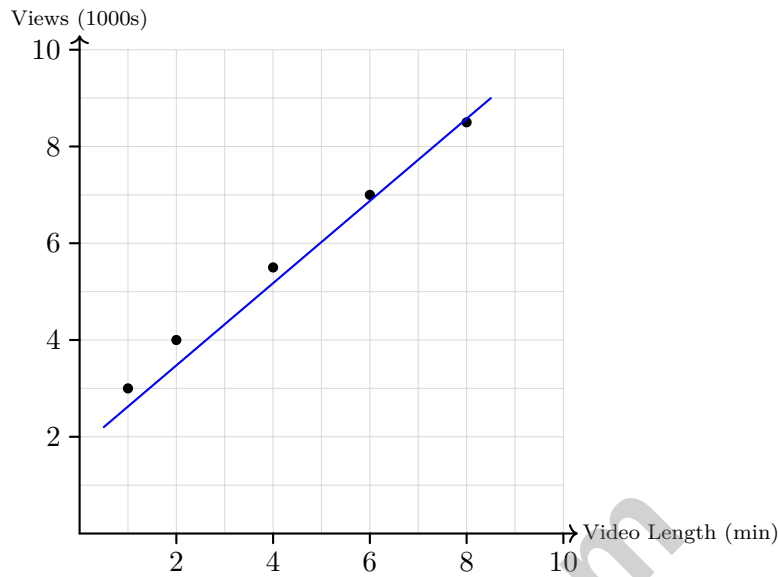
☐ C. $\frac{6}{36}$

☐ B. $\frac{11}{36}$

☐ D. $\frac{25}{36}$



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& answers



4)

A content creator analyzes video length versus view count. Using the trend line, by how much do views increase per minute of video length?

- ☐ A. Approximately 0.8 thousand views/min
 ☐ C. Approximately 1.5 thousand views/min
- ☐ B. Approximately 1.1 thousand views/min
 ☐ D. Approximately 2 thousand views/min

5) If $\sqrt{x}$ is rational and x is a positive integer, what must be true about x ?

- ☐ A. x is odd
 ☐ C. x is prime
- ☐ B. x is greater than 10
 ☐ D. x is a perfect square

6) Convert $0.\overline{72}$ to a fraction in simplest form.

- ☐ A. $\frac{8}{100}$
☐ C. $\frac{72}{90}$
- ☐ B. $\frac{72}{100}$
☐ D. $\frac{72}{99} = \frac{8}{11}$



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) Large triangle = $\frac{1}{2} \times 16 \times 10 = 80 \text{ ft}^2$. Small triangle = $\frac{1}{2} \times 8 \times 5 = 20 \text{ ft}^2$. Remaining = $80 - 20 = 60 \text{ ft}^2$.
- 2) **Choice C is correct.** (8.EE.8) The two lines intersect at the marked point, which is (1, 1).
- 3) **Choice B is correct.** (8.F.1) Each student ID uniquely identifies one student with one current math grade. Options A, C, and D can pair one input with multiple outputs.
- 4) **The correct answer is $x = 3$.** (8.EE.7) Distribute the 3: $3x + 6 - 5 = x + 7$. Simplify: $3x + 1 = x + 7$. Subtract x from both sides: $2x + 1 = 7$. Subtract 1 from both sides: $2x = 6$. Divide by 2: $x = 3$. Verify: $3(3+2) - 5 = 3(5) - 5 = 15 - 5 = 10$ and $3 + 7 = 10$ ✓.
- 5) **Choice A is correct.** (8.G.3) Reflection across $y = -x$ maps $(x, y) \rightarrow (-y, -x)$. So $(5, 0) \rightarrow (0, -5)$.
- 6) **Choice C is correct.** (8.G.9) When linear scale is $k = \frac{3}{2}$, volume scales by $k^3 = \left(\frac{3}{2}\right)^3 = \frac{27}{8}$.
- 7) **Choice A is correct.** (8.G.4) Composite linear scale factor: $\frac{2}{3} \times \frac{3}{2} = 1$. Composite area scale factor: $\left(\frac{2}{3}\right)^2 \times \left(\frac{3}{2}\right)^2 = \frac{4}{9} \times \frac{9}{4} = 1$. The area remains unchanged (the dilations are inverses).
- 8) **Choice B is correct.** (8.G.8) The origin is easy to test computationally and gives quick results. If the boundary line passes through (0, 0), choose another convenient point like (1, 0) or (0, 1).
- 9) **Choice C is correct.** (8.G.2) Congruent rectangles have the same dimensions. M'N'O'P' must have dimensions 15 cm and 8 cm (possibly rotated). A rectangle with dimensions 16 cm and 8 cm is NOT congruent.
- 10) **Choice B is correct.** (8.G.6, 8.G.7) From $(\sqrt{7})^2 + 3^2 = c^2$, we get $7 + 9 = 16$, so $c = \sqrt{16} = 4$.
- 11) **Choice D is correct.** (8.G.9) From $V = \frac{1}{3}\pi r^2 h$: $150\pi = \frac{1}{3}\pi \times 25 \times h \Rightarrow 450 = 25h \Rightarrow h = 18 \text{ cm}$.
- 12) **Choice D is correct.** (8.SP.1) Correlation (weak or strong) never proves causation. The phrase “causes” is incorrect. The statement should say “correlates with” or “is associated with” lower GPAs. Other factors (parental involvement, motivation, socioeconomic factors) may drive both variables.
- 13) **Choice B is correct.** (8.SP.3) The line goes from (0, 3.0) to (4, 4.2) on the graph (representing \$30,000 to \$42,000). Slope = $\frac{4.2-3.0}{4-0} = \frac{1.2}{4} = 0.3$ (in units of \$10,000), or \$3000/year.
- 14) **Choice C is correct.** (8.SP.3) Joint frequency: intersection cell (45) divided by grand total (120). This answers ‘what fraction of all respondents are rural car-owners?’ = $\frac{45}{120} \approx 0.375$.
- 15) **Choice A is correct.** (8.F.4) Slope is $m = \frac{11-5}{4-1} = \frac{6}{3} = 2$.
- 16) **Choice D is correct.** (8.F.5) A zero of a function is a point where $f(x) = 0$, represented on a graph as an x -intercept (where the curve crosses the x -axis). Option A is a y -intercept, B is a maximum, C is undefined.
- 17) **The correct answer is 55 units.** (8.EE.7) The inequality is $45 + x \geq 100$. Subtract 45: $x \geq 55$. The worker must complete at least 55 more units.
- 18) **The correct answer is A,B.** (8.EE.6) Options A and B both have slope 4, making them parallel. Option C has slope -4 , option D has slope $\frac{1}{4}$, and option E has slope 2, so none of these match.
- 19) **Choice C is correct.** (8.G.5) In an equilateral triangle, all three angles are equal. Since they sum to 180° , each angle is $180 \div 3 = 60^\circ$.
- 20) **Choice A is correct.** (8.G.8) Distance = $\sqrt{(4-1)^2 + (6-2)^2} = \sqrt{9+16} = \sqrt{25} = 5$.
- 21) **Choice B is correct.** (8.G.7) Vertical angles are congruent. So $y = 54^\circ$.
- 22) **Choice B is correct.** (8.G.5) The sum of exterior angles of any convex polygon is always 360° , regardless of shape or number of sides.
- 23) **Choice B is correct.** (8.G.7) Two of the five sections are shaded, so $P(\text{shaded}) = \frac{2}{5}$.
- 24) **Choice B is correct.** (8.EE.5) Each of the 4 colors can pair with each of the 3 sizes: $4 \times 3 = 12$ total options.
- 25) **The correct answer is 45.** (8.EE.7) Substitute $x = 1$: $(1+4)(1+8) = 5 \cdot 9 = 45$.
- 26) **Choice B is correct.** (8.SP.2) Both have slope $m = -2$ but intercepts of 5 and -3 respectively. These are parallel lines.



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Hi, Math Hero!

◇ This broad and demanding book gave you seven strong Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. You showed up for Grade 8 practice again and again. That is what real growth looks like: steady effort, honest review, and a willingness to try. ◇

★ **Remember this:** A math hero is not someone who never misses a question. A math hero learns from the miss and comes back stronger. ★

Hero Habits

- **Courage:** You try problems that are not automatic.
- **Honesty:** You review what needs work.
- **Patience:** You let skills grow over time.
- **Pride:** You recognize the effort you gave.

Grade 8 test-day tip: Save one solved problem you are proud of. Looking back at progress helps motivation stay strong.

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

Jay Daie

Your Math Hero Guide

PRACTICE TODAY SUCCEED TOMORROW!

Give your child the confidence and skills they need with **7 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!

GRADE 8

Practice
Today
Succeed
Tomorrow!

Algebra

Geometry

Statistics

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.



Build Skills & Boost Confidence

Strengthen understanding and feel prepared for test day.

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! |



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BUILD CONFIDENCE. SHARPEN SKILLS. ACE YOUR EXAM!