

9

South Dakota

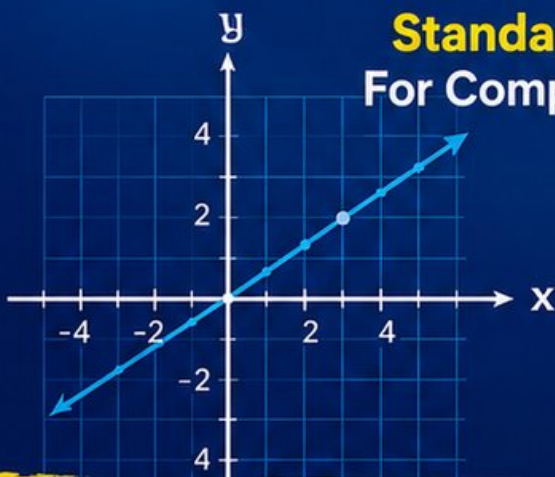
Smarter Balanced

Grade 8

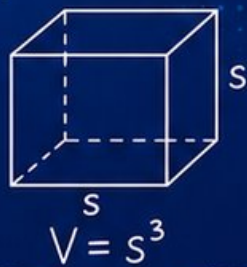
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



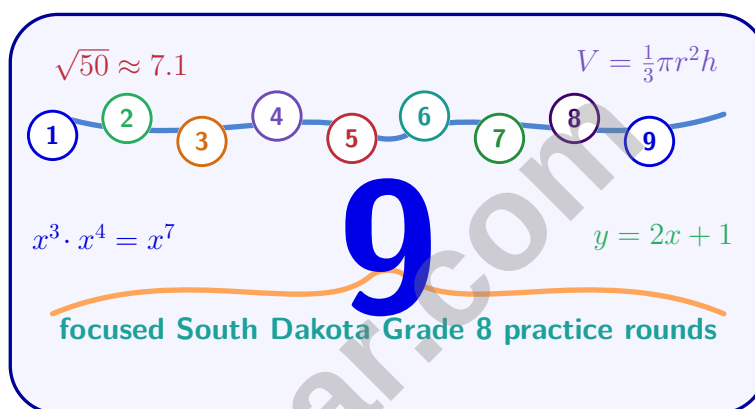
$$2x + 3y = 12$$
$$y = mx + b$$

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

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

9 South Dakota Smarter Balanced Grade 8 Math Practice Tests

Complete South Dakota Practice for Functions, Systems, Geometry, Data, and Probability



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, South Dakota 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 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 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.

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?

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.

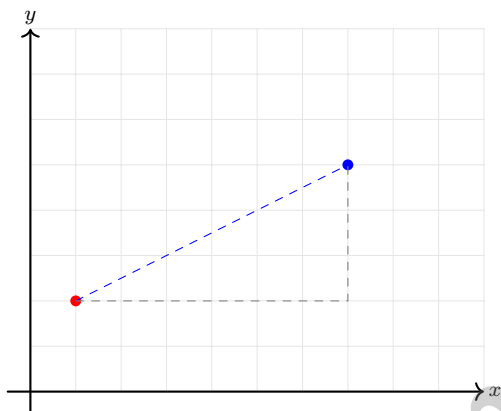


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& answers

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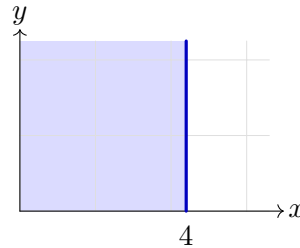
- 1) Two vertices of a rectangle are at $(1, 2)$ and $(7, 5)$. What is the length of the diagonal connecting these two vertices?



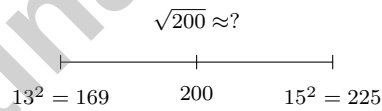
- ☐ A. $\sqrt{45}$ ☐ C. 10
☐ B. 9 ☐ D. 13
- 2) A point P is at $(5, 3)$. After a translation of $(-2, 4)$, the point moves to P' . What is the distance from P to P' ?
- ☐ A. $\sqrt{5}$ units ☐ C. 6 units
☐ B. $\sqrt{20}$ units ☐ D. $\sqrt{45}$ units
- 3) A phone plan charges \$20 base plus \$0.10 per text. If you budget at most \$35, which inequality shows max texts?
- ☐ A. $0.10t + 20 > 35$ ☐ C. $0.10 + 20t \geq 35$
☐ B. $20t + 0.10 \leq 35$ ☐ D. $0.10t + 20 \leq 35$



- 4) A student sees a graph with a SOLID vertical line at $x = 4$. The left side is shaded. What does this represent?



- ☐ A. $x < 4$
☐ C. $x > 4$
☐ B. $x \leq 4$
☐ D. $x \geq 4$
- 5) Simplify $\frac{4x^5}{2x^3}$.
- ☐ A. $4x^2$
☐ C. x^2
☐ B. $2x^8$
☐ D. $2x^2$
- 6) Which is a reasonable approximation for $\sqrt{200}$?



- ☐ A. 12
 ☐ C. 16
☐ B. 18
 ☐ D. 14
- 7) A line passes through $(-2, 1)$ and $(2, 9)$. What is the slope?
- ☐ A. $\frac{1}{2}$
☐ C. 4
☐ B. 8
 ☐ D. 2



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8) Solve for x : $\frac{2x}{3} = 8$

☐ A. $x = 12$

☐ C. $x = 24$

☐ B. $x = 16$

☐ D. $x = 6$

9) Factor $x^2 - 11x + 24$.

☐ A. $(x - 3)(x - 8)$

☐ C. $(x - 2)(x - 12)$

☐ B. $(x - 4)(x - 6)$

☐ D. $(x + 3)(x + 8)$

10) A student claims: "If input 5 appears three times in a table, it cannot be a function." Is the student correct?

☐ A. Yes, any repeated input means it is not a function.

☐ C. No, repeated inputs are only a problem if outputs differ.

☐ B. No, repeated inputs are never a problem.

☐ D. Yes, the domain cannot have repeated values.

11) A plant grows such that its height is modeled by $h = 2t + 15$, where h is height in cm and t is time in weeks. Interpret the meaning of the number 2 in this equation.

☐ A. The plant starts at a height of 2 cm.

☐ C. The plant reaches a height of 2 cm.

☐ D. The plant grows for 2 weeks total.

☐ B. The plant grows 2 cm per week.

12) A rectangle MNOP undergoes a 90-degree clockwise rotation about its center. Which statement is true about rectangle M'N'O'P'?

☐ A. The area increases by half

☐ D. The rectangle is congruent to the original

☐ B. The shape is no longer a rectangle

☐ C. The area doubles

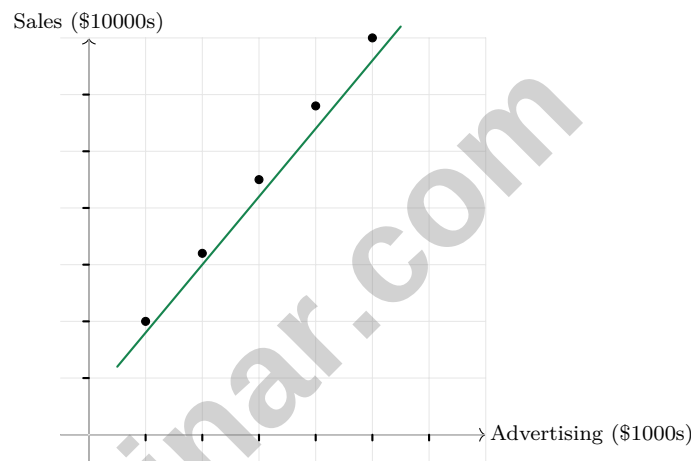


1) Which scenario would most likely result in a smaller MAD after removing an outlier?

- ☐ A. The outlier equals the mean ☐ C. The outlier is far from the mean
☐ B. The outlier is the only value ☐ D. The data set has one value

2) Angles A and B are complementary. If $A = 38^\circ$, what is the measure of angle B ?

- ☐ A. 52° ☐ C. 142°
☐ B. 62° ☐ D. 128°



3)

A business tracks advertising spend vs. sales. The model is $S = 1.1a + 0.8$, where S is sales and a is advertising. What does the 0.8 intercept tell you?

- ☐ A. Sales decrease by \$0.80 per \$1000 ad spend ☐ C. The company spends \$800 on advertising initially
☐ B. Base sales of \$8000 occur with zero ad spend ☐ D. Maximum possible sales are \$8000

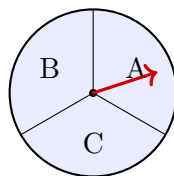


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4) Which statement about the table below is true?

	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 $\frac{144}{360} = 0.40$.
- ☐ B. The relative frequency of Debate club among Math students is $\frac{36}{120} \approx 0.30$.
 ☐ D. The joint relative frequency of Science and English is $\frac{84}{360} = 0.23$.
- 5) A cafe has 9 types of sandwiches and 4 types of drinks. How many different lunch combinations (one sandwich + one drink) can a customer order?
- ☐ A. $9 + 4 = 13$
☐ C. $9 \times 4 = 36$
- ☐ B. $9 - 4 = 5$
☐ D. $\frac{9}{4} = 2.25$
- 6) A fair spinner with sections A, B, C (each $\frac{1}{3}$ probability) is spun three times. What is the probability of getting C on all three spins?



- ☐ A. $\frac{1}{9}$
☐ C. $\frac{3}{27}$
- ☐ B. $\frac{1}{27}$
☐ D. $\frac{1}{3}$



1) Which set contains only irrational numbers?

☐ A. $\{1, 2, 3\}$

☐ C. $\{\sqrt{2}, 3, \sqrt{5}\}$

☐ B. $\{\sqrt{4}, \sqrt{9}, \sqrt{16}\}$

☐ D. $\{\sqrt{2}, \sqrt{3}, \sqrt{5}\}$

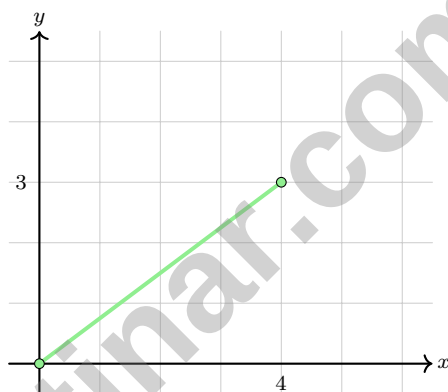
2) A composite solid consists of a cube with edge 2 cm on top of a rectangular prism base with dimensions $4 \times 4 \times 3$ cm (where the cube sits on one face of the prism, sharing a 2×2 face). Ignoring the shared face, what is the combined surface area?

☐ A. 60 cm^2

☐ C. 84 cm^2

☐ B. 76 cm^2

☐ D. 96 cm^2



3)

The equation of the line is:

☐ A. $y = 3x$

☐ C. $y = \frac{3}{4}x$

☐ B. $y = \frac{4}{3}x$

☐ D. $y = 4x$

4) Point P is translated 6 units left and 8 units up to form point P'. If P is at $(3, -2)$, what are the coordinates of P'?

☐ A. $(-3, 6)$

☐ C. $(-3, -10)$

☐ B. $(9, 6)$

☐ D. $(9, -10)$



5) In triangle PQR , angle $P = (4x)^\circ$, angle $Q = (2x + 10)^\circ$, and angle $R = (3x - 10)^\circ$. Find angle P .

☐ A. 40° ☐ C. 80° ☐ B. 60° ☐ D. 100°

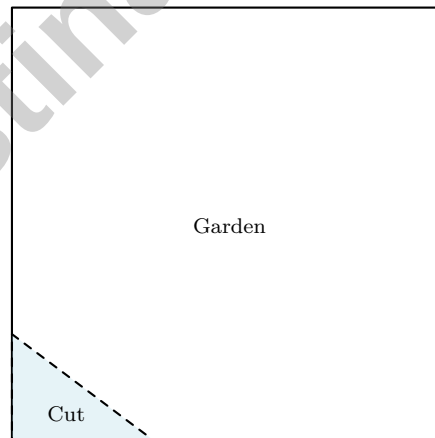
6) Which set of side lengths forms a right triangle?

☐ A. 7, 10, 12☐ C. 4, 5, 10☐ B. 6, 8, 10☐ D. 1, 2, 4

7) A square pyramid has a height of 8 inches and a volume of 128 in^3 . What is the length of each base edge?

☐ A. 4 in☐ C. 8 in☐ B. $4\sqrt{3}$ in☐ D. 12 in

8) A garden has the shape of a square with side length 12 m with a triangular corner cut out (base 4 m, height 3 m). What is the remaining area of the garden?

☐ A. 138 m^2 ☐ C. 141 m^2 ☐ B. 140 m^2 ☐ D. 144 m^2 

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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 A is correct.** (8.G.8) $d = \sqrt{(7-1)^2 + (5-2)^2} = \sqrt{6^2 + 3^2} = \sqrt{36+9} = \sqrt{45}$.
- 2) **Choice B is correct.** (8.G.1) The translation vector is $(-2, 4)$, so the distance moved is the magnitude: $\sqrt{(-2)^2 + 4^2} = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$ units.
- 3) **Choice D is correct.** (8.EE.7) Base (20) plus texts at 0.10 each $(0.10t)$, total at most 35.
- 4) **Choice B is correct.** (8.G.8) SOLID line means the boundary is INCLUDED ($\leq$ or $\geq$). Shading to the LEFT means x values are at most 4, so $x \leq 4$.
- 5) **Choice D is correct.** (8.EE.1) Divide coefficients: $\frac{4}{2} = 2$. Divide powers: $\frac{x^5}{x^3} = x^2$. Result: $2x^2$.
- 6) **Choice D is correct.** (8.EE.2) $\sqrt{200} = \sqrt{100 \times 2} = 10\sqrt{2} \approx 10 \times 1.41 = 14.1$. So 14 is the closest integer.
- 7) **Choice D is correct.** (8.EE.6) Slope = $\frac{9-1}{2-(-2)} = \frac{8}{4} = 2$.
- 8) **Choice A is correct.** (8.EE.7) Multiply both sides by 3: $2x = 24$. Divide by 2: $x = 12$.
- 9) **Choice B is correct.** (8.EE.7) Find two numbers that multiply to 24 and add to -11 : -4 and -6 . Verify: $(-4)(-6) = 24$ and $-4 - 6 = -11$.
- 10) **Choice C is correct.** (8.F.1) A relation is a function only if each input has exactly one output. If input 5 appears three times but with the same output, it is still a function (just redundantly listed).
- 11) **Choice B is correct.** (8.F.4) In $h = mt + b$, the slope $m = 2$ represents the rate of change: 2 cm per week. The number 15 is the initial height (intercept).
- 12) **Choice D is correct.** (8.G.2) Rotation is a rigid motion that preserves shape and size. Rectangle M'N'O'P' is congruent to MNOP (same dimensions, though the length and width labels may have switched visually).
- 13) **Choice B is correct.** (8.G.5) Alternate interior angles are on opposite sides of the transversal and between the parallel lines.
- 14) **Choice B is correct.** (8.G.6, 8.G.7) The correct calculation uses the Pythagorean Theorem: $5^2 + b^2 = 13^2$ gives $25 + b^2 = 169$, so $b = 12$. The student's error was subtracting instead of using $a^2 + b^2 = c^2$.
- 15) **Choice C is correct.** (8.G.9) $V_A = \frac{1}{3} \times 16 \times 9 = 48 \text{ cm}^3$. $V_B = \frac{1}{3} \times 64 \times 18 = 384 \text{ cm}^3$. Ratio: $\frac{384}{48} = 8$. When linear scale is $2\times$, volume scales by $2^3 = 8\times$.
- 16) **Choice C is correct.** (8.NS.2) $\sqrt{48} = 4\sqrt{3} \approx 4 \times 1.73 = 6.92 \approx 6.9$. Distractor B (7.0) confuses with nearby perfect square $\sqrt{49} = 7$; A and D are unreasonable bounds.
- 17) **The correct answer is 100.** (8.EE.3) When dividing powers with the same base, subtract the exponents. $10^{5-3} = 10^2$, and $10^2 = 100$, so 10^5 is 100 times larger than 10^3 .
- 18) **Choice D is correct.** (8.G.7) Option 1: $I = 800 \times 0.10 \times 1 = \80 . Option 2: \$0 interest. Difference: $\$80 - \$0 = \$80$.
- 19) **Choice C is correct.** (8.EE.4) Multiply coefficients: $4.8 \times 1.25 = 6$. Add exponents: $10^{-2+2} = 10^0 = 1$. Result: $6 \times 10^0 = 6 \times 1 = 6$.
- 20) **Choice D is correct.** (8.EE.5) Unit rate: $\frac{8}{10} = 0.8$ oz per minute. After 45 minutes: $0.8 \times 45 = 36$ ounces.
- 21) **Choice A is correct.** (8.EE.8) When two distinct lines do not intersect (parallel lines), they have no points in common, so the system has no solution.
- 22) **The correct answer is A,B.** (8.G.9) Cylinder $V = 3.14 \times 9 \times 7 = 197.82 \text{ cm}^3$ (A correct); Cone $V = \frac{1}{3} \times 3.14 \times 9 \times 7 = 65.94 \text{ cm}^3$ (B correct). C is wrong (incorrect cylinder volume), D is wrong (that's the cylinder volume), E is wrong (cone is $\frac{1}{3}$ cylinder).
- 23) **Choice D is correct.** (8.F.2) First line starts at $(0, 1)$ (higher). If slopes are close, first stays above. If second has much steeper slope, it can overtake first in Q1. Answer depends on specific slopes.
- 24) **Choice D is correct.** (8.F.3) The equation $y = 5 - 4x$ is in the form $y = mx + b$ with $m = -4$ and $b = 5$, so it is linear. The other functions contain exponents (3), square roots, or reciprocals, making them nonlinear.



Hi, Detail Champion!

◇ In Grade 8, small details can change an entire answer: a negative sign, a decimal place, a unit, an exponent, or an inequality symbol. ◇

★ **Remember this:** You practiced noticing those details. That is a serious test skill, and it gets better with every careful review. This version gave you 9 opportunities to rehearse test-day habits. ★

Detail Checks

- **Signs:** Circle negatives before simplifying.
- **Symbols:** Read inequality signs carefully.
- **Decimals:** Line up place values.
- **Units:** Match the unit the question asks for.

Grade 8 test-day tip: Use the final minute on each section for a detail scan, not a full redo.

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

Jay Daie

Your Detail-Check 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!



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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Better **Results.**