

8

South Dakota

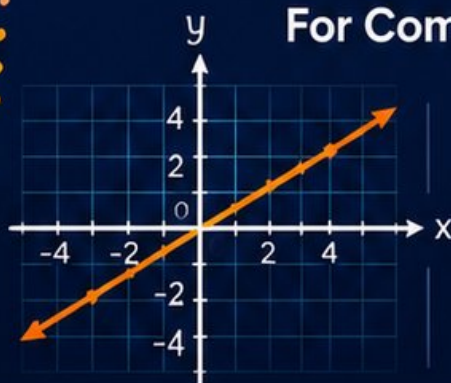
Smarter Balanced

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$A = \pi r^2$$

$$C = 2\pi r$$

$$V = \frac{1}{3}\pi r^2 h$$



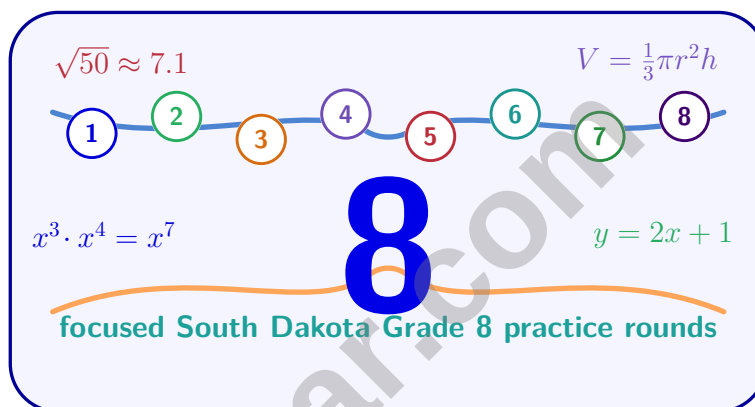
$$V = \frac{1}{3}b^2 h$$

**8** PRINTED TESTS**2** ONLINE TESTS

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

8 South Dakota Smarter Balanced Grade Math Practice Tests

South Dakota Practice for Grade 8 Functions, Geometry, and Data



Eight 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!

Eight focused rounds for sharper Smarter Balanced math thinking

This book gives you eight 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

An eight-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?

Eight Smarter Balanced tests, 320 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 7–8	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.

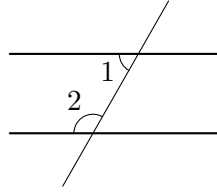


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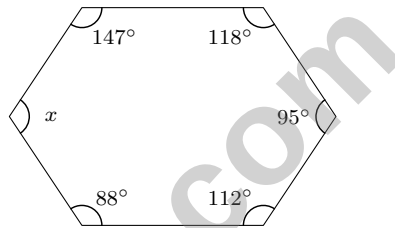
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- 1) Which angle pair is formed when a transversal crosses two parallel lines and both angles are on the same side of the transversal and between the lines?



- ☐ A. Alternate interior angles ☐ C. Co-interior angles
☐ B. Corresponding angles ☐ D. Alternate exterior angles



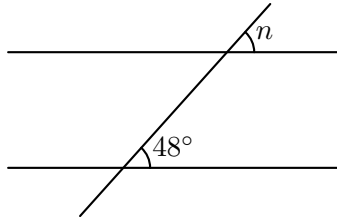
2)

A hexagon has five interior angles: 88° , 112° , 95° , 118° , 147° . Find the sixth angle.

- ☐ A. 150° ☐ C. 170°
☐ B. 160° ☐ D. 180°
- 3) A hiker walks from camp at $(0, 0)$ to a landmark at $(3, 4)$ on a map where each unit represents 1 mile. How many miles did the hiker walk in a straight line?
- ☐ A. 7 miles ☐ C. $\sqrt{7}$ miles
☐ B. 5 miles ☐ D. 12 miles



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4)

Two parallel lines are cut by a transversal. One angle below the transversal measures 48° . What is n , the corresponding angle above the line?

☐ A. 42° ☐ C. 132° ☐ B. 48° ☐ D. 138°

5) Find the Mean Absolute Deviation (MAD) of the data set $\{2, 4, 6, 8, 10\}$.

☐ A. 2☐ C. 3☐ B. 2.4☐ D. 6

6) A bag has 9 cards: 4 red, 3 blue, 2 green. Three cards are drawn without replacement. What is the probability that all three are red?

☐ A. $\frac{4}{9}$ ☐ C. $\frac{12}{504}$ ☐ B. $\frac{24}{504}$ ☐ D. $\frac{64}{729}$

7) When the correlation between two variables is weak, the trend line:

☐ A. Has a slope of zero☐ D. Will be very accurate for predictions☐ B. Should not be used at all☐ C. Will have large residuals and less reliable predictions

8) Which of the following is irrational?

☐ A. $\sqrt{49}$

☐ B. $\frac{7}{8}$

☐ C. $\sqrt{50}$

☐ D. 2.5

Algorithm for $0.2\bar{5}$

Step 1: $x = 0.2\bar{5}$

Step 2: $10x = 2.\bar{5}$, $100x = 25.\bar{5}$

Step 3: subtract the aligned equations

Step 4: solve for x

9)

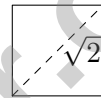
What is $0.2\bar{5}$ as a fraction?

☐ A. $\frac{25}{100}$

☐ B. $\frac{25}{90}$

☐ C. $\frac{2}{10}$

☐ D. $\frac{23}{90}$



Side = 1

10)

The diagonal of a square with side length 1 unit is $\sqrt{2}$ units. Between which integers is this diagonal?

☐ A. Between 0 and 1

☐ B. Between 3 and 4

☐ C. Between 2 and 3

☐ D. Between 1 and 2

11) Which is larger: $\sqrt{3} \times \sqrt{8}$ or 4.8?

☐ A. Cannot be determined

☐ B. 4.8 is larger

☐ C. They are exactly equal

☐ D. $\sqrt{3} \times \sqrt{8}$ is larger


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1) What is the error in this work: $\sqrt[3]{100} = 10$?

☐ A. $10^3 = 100$

☐ C. $10^3 = 1000$, not 100

☐ B. $10^2 = 1000$

☐ D. $\sqrt[3]{100} = 100^3$

2) A fitness gym charges only a flat \$50 monthly fee with no additional per-visit costs. If C is total monthly cost and m is the number of months, which equation represents this?

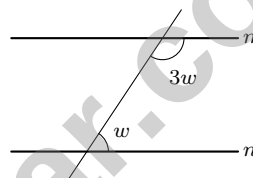
☐ A. $C = m + 50$

☐ C. $C = 50$

☐ B. $C = 50m$

☐ D. $C = m^2$

3) Parallel lines m and n are cut by a transversal t . One co-interior angle is three times the other. If the smaller angle is w° , what is w ?



☐ A. 30°

☐ C. 45°

☐ B. 40°

☐ D. 60°

4) A car's fuel consumption shows: rapid decrease at first, then slowing. Which behavior does this match?

☐ A. Draining a pool with a pump

☐ C. Linear fuel burn

☐ B. Radioactive decay (initial sharp drop, then levels off)

☐ D. Exponential growth



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- 5) A student claims the sum of interior angles of a nonagon is 1260° . Is this correct?
- ☐ A. Yes, 1260° is correct. ☐ C. No, it is 1440° .
☐ B. No, it is 1080° . ☐ D. No, it is 1620° .
- 6) Given $f(x) = x^2$ and $g(x) = 2x + 1$, which statement is true?
- ☐ A. $f(3) = g(3)$ ☐ C. $f(3) < g(3)$
☐ B. $f(3) > g(3)$ ☐ D. Cannot be determined
- 7) A triangular prism has a right triangular base with legs 3 cm and 4 cm, and hypotenuse 5 cm. The height (length) of the prism is 7 cm. What is the total surface area?
- ☐ A. 12 cm^2 ☐ C. 72 cm^2
☐ B. 60 cm^2 ☐ D. 96 cm^2
- 8) Hexagon ABCDEF is congruent to hexagon GHIJKL. The perimeter of ABCDEF is 48 cm. What is the perimeter of GHIJKL?
- ☐ A. 24 cm ☐ C. 96 cm
☐ B. 48 cm ☐ D. Cannot be determined
- 9) A right triangle has legs of 2 and 3. What is the hypotenuse?
- ☐ A. 5 ☐ C. 6
☐ B. $\sqrt{13}$ (approximately 3.61) ☐ D. 2.5

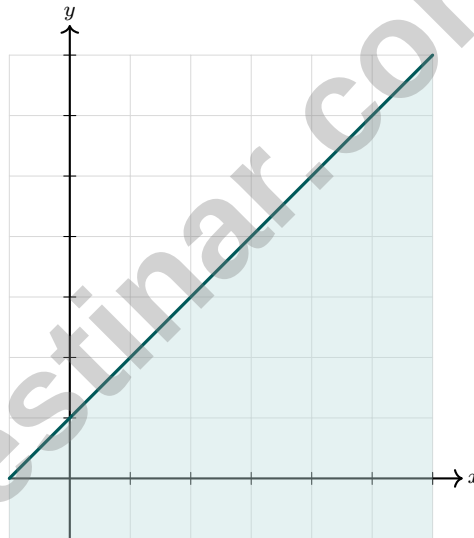


1) Consider the set $\{(a, 1), (b, 2), (c, 1), (d, 3)\}$ where a, b, c, d are distinct. Is this a function?

- ☐ A. No, because output 1 appears twice. ☐ D. Yes, output can repeat; each input must be unique.
☐ B. Yes, because all inputs are distinct.
☐ C. No, because there are four pairs.

2) A point (p, q) is reflected across the y -axis, giving $(-p, q)$. Then it is reflected across the x -axis, giving $(-p, -q)$. What single transformation produces the same result?

- ☐ A. 90° rotation about the origin ☐ C. 270° rotation about the origin
☐ B. 180° rotation about the origin ☐ D. Reflection across the line $y = x$



3)

Which inequality matches the graph?

- ☐ A. $y > x + 1$ ☐ C. $y \leq x + 1$
☐ B. $y < x + 1$ ☐ D. $y \geq x + 1$



4) Multiply: $(x + 2)(x + 6)$.

☐ A. $x^2 + 8x + 12$

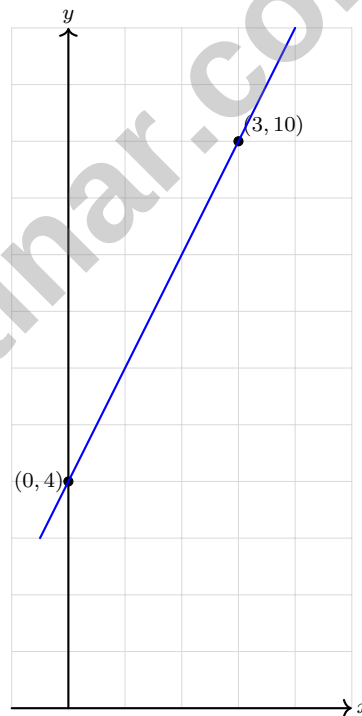
☐ B. $x^2 + 12$

☐ C. $x^2 + 6x + 8$

☐ D. $x^2 + 2x + 6$

5) If $\frac{b^n}{b^4} = b^6$, what is the value of n ?

6) The graph shows a line passing through $(0, 4)$ and $(3, 10)$.



What is the equation of the line?

☐ A. $y = 2x + 4$

☐ B. $y = 3x + 4$

☐ C. $y = 2x + 3$

☐ D. $y = 4x + 3$



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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.5)** Co-interior angles (also called same-side interior or consecutive interior angles) are on the same side of the transversal and between the parallel lines.
- 2) **Choice B is correct.** **(8.G.5)** A hexagon's interior angles add to 720° . The known angles add to $88+112+95+118+147 = 560^\circ$, so the sixth angle is $720 - 560 = 160^\circ$.
- 3) **Choice B is correct.** **(8.G.8)** Distance = $\sqrt{(3-0)^2 + (4-0)^2} = \sqrt{9+16} = \sqrt{25} = 5$ miles. (This is a 3-4-5 Pythagorean triple.)
- 4) **Choice B is correct.** **(8.G.7)** Corresponding angles formed by a transversal cutting parallel lines are congruent. So $n = 48^\circ$.
- 5) **Choice B is correct.** **(8.G.8)** Mean = 6. Absolute deviations: $|2-6| = 4$, $|4-6| = 2$, $|6-6| = 0$, $|8-6| = 2$, $|10-6| = 4$. Sum = 12. MAD = $12/5 = 2.4$.
- 6) **Choice B is correct.** **(8.G.7)** $P = \frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} = \frac{24}{504} = \frac{1}{21}$.
- 7) **Choice C is correct.** **(8.SP.2)** Weak correlation means data is scattered, with large residuals and less certainty in predictions made from the line.
- 8) **Choice C is correct.** **(8.NS.1)** $\sqrt{50}$ is irrational because 50 is not a perfect square. The other values are rational: $\sqrt{49} = 7$, $\frac{7}{8} = 0.875$ (terminating decimal), and 2.5 is a terminating decimal.
- 9) **Choice D is correct.** **(8.G.1)** Following the algorithm: $100x - 10x = 25.5 - 2.5 = 23$, so $90x = 23$ and $x = \frac{23}{90}$.
- 10) **Choice D is correct.** **(8.NS.2)** Since $1^2 = 1$ and $2^2 = 4$, and $1 < 2 < 4$, we have $1 < \sqrt{2} < 2$.
- 11) **Choice D is correct.** **(8.NS.2)** $\sqrt{3} \times \sqrt{8} = \sqrt{24} = 2\sqrt{6} \approx 4.899$. That is greater than 4.8, so the product is larger.
- 12) **Choice A is correct.** **(8.EE.7)** Add 6: $2x \leq 16$. Divide by 2: $x \leq 8$.
- 13) **Choice D is correct.** **(8.EE.6)** Slope = $\frac{1-7}{3-0} = \frac{-6}{3} = -2$.
- 14) **Choice D is correct.** **(8.EE.7)** Perimeter = $2(\text{length}) + 2(\text{width}) = 2(w+3) + 2w = 26$.
- 15) **Choice C is correct.** **(8.EE.7)** Difference of squares: $(x+4)(x-4) = x^2 - 4^2 = x^2 - 16$.
- 16) **Choice B is correct.** **(8.G.9)** $V_X = \frac{1}{3} \times 64 \times 10 \approx 213.3 \text{ cm}^3$. $V_Y = \frac{1}{3} \times 60 \times 12 = 240 \text{ cm}^3$. Pyramid Y is larger.
- 17) **Choice D is correct.** **(8.G.7)** Interest: $I = 4000 \times 0.03 \times 3 = \360 . Final: $4000 + 360 = \$4,360$.
- 18) **The correct answer is 25.** **(8.F.5)** After 3 hours: $10 + 3 \times 5 = 25$ degrees C. Then it stays constant for 2 hours, so the final temperature is 25 degrees C.
- 19) **The correct answer is 55.** **(8.SP.3)** Substitute $n = 500$: $C = 0.08(500) + 15 = 40 + 15 = \55 .
- 20) **Choice D is correct.** **(8.EE.1)** Multiply exponents: $(p^{-2})^3 = p^{-2 \cdot 3} = p^{-6}$.
- 21) **The correct answer is $\frac{1}{2}$.** **(8.SP.3)** Among juniors: $\frac{100}{100+100} = \frac{100}{200} = \frac{1}{2} = 0.5$.
- 22) **The correct answer is B,E.** **(8.F.4)** Option B is correct because the constant term 35 is the fixed monthly cost. Option E is correct because at $t = 0$, $C = 0.10(0) + 35 = 35$. The slope is 0.10, so the cost per text is \$0.10, not \$0.35.
- 23) **Choice A is correct.** **(8.EE.2)** Check each: A is correct. B: $\sqrt{64} = 8 \neq 7$. C: $\sqrt{100} = 10 \neq 5$. D: $\sqrt[3]{64} = 4 \neq 8$.
- 24) **Choice D is correct.** **(8.EE.3)** A negative exponent shifts the decimal to the left. Move the decimal 3 places left: $6.5 \times 10^{-3} = 0.0065$.
- 25) **Choice C is correct.** **(8.EE.4)** Correct rule: multiply coefficients and add exponents. The student got $2 \times 4 = 8$ correct, but mistakenly multiplied $3 \times 4 = 12$ instead of adding $3 + 4 = 7$.
- 26) **Choice C is correct.** **(8.EE.5)** $y = 2.54(10) = 25.4$ cm. The unit rate is 2.54 cm per inch.
- 27) **Choice A is correct.** **(8.EE.8)** Check (1, 3) in both equations: $3 = -2(1) + 5$ and $3(1) + 3 = 6$. So (1, 3) is the solution.
- 28) **Choice C is correct.** **(8.F.1)** A point has one x -value with one y -value, so it passes the vertical line test. A vertical line is not a function (fails VLT). Circles and ellipses fail the VLT.
- 29) **Choice A is correct.** **(8.F.2)** Rate for Table 1: $(5-1)/(2-0) = 2$. Rate for Table 2: $(-1-(-2))/(1-0) = 1$. Since $2 > 1$, Table 1 is steeper.



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Hi, Math Communicator!

◇ Grade 8 math is not only about getting a number. It is about explaining relationships and making your reasoning visible. ◇

★ **Remember this:** When you show steps, label diagrams, and write clear answers, you are joining the conversation that math is trying to have. You practiced across 8 full Grade 8 practice tests, and that repeated effort matters. ★

Communication Skills

- **Use Words:** Explain what the answer means.
- **Use Symbols:** Keep equations accurate.
- **Use Diagrams:** Show relationships visually.
- **Use Units:** Connect math to context.

Grade 8 test-day tip: For open-ended questions, answer in a complete thought: value, unit, and reason.

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

Jay Daie

Your Math Communication Coach

PRACTICE TODAY, SUCCEED TOMORROW!

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror 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.



BUILD SKILLS & BOOST CONFIDENCE

Strengthen understanding and feel prepared for test day.



COVERS ALL ESSENTIAL TOPICS

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



2 EXTRA ONLINE PRACTICE TESTS INCLUDED!

Use these two additional online practice tests for extra review after the printed tests.

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More Practice. More Confidence.
Better Results.