

# 8

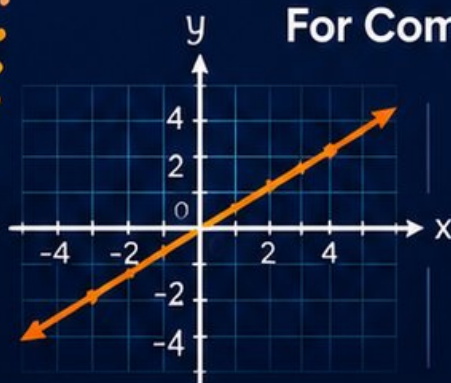
# Iowa ISASP

## 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

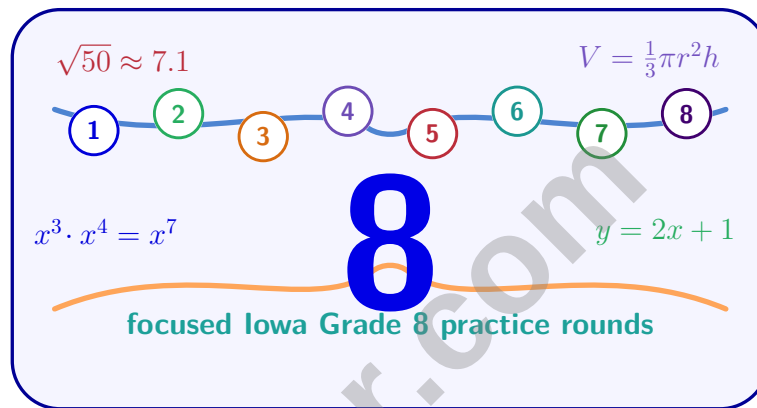
# 2

 ONLINE  
TESTS

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

# 8 Iowa ISASP Grade 8 Math Practice Tests

*Iowa Practice for Grade 8 Functions, Geometry, Data, and Probability*



Eight complete 40-question Grade 8 ISASP 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, Iowa Grade 8 Problem Solver!

Eight focused rounds for sharper ISASP math thinking

This book gives you eight full Grade 8 ISASP 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 Iowa 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.

**Iowa 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 ISASP 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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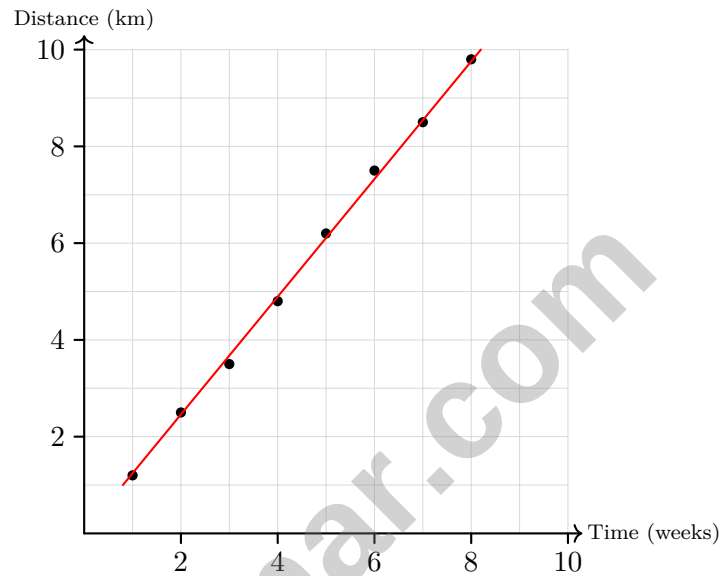
1) Which type of transformation maps a figure to a congruent image without changing its position relative to orientation?

☐ A. Reflection

☐ C. Translation

☐ B. Rotation

☐ D. Dilation



2)

A runner training program tracks distance over time. Based on the trend line, what is the approximate slope (distance per week)?

☐ A. 1 km per week

☐ C. 2 km per week

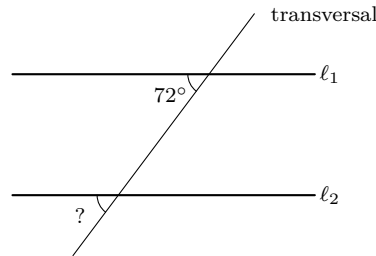
☐ B. 1.2 km per week

☐ D. 0.5 km per week





- 3) Two parallel lines are cut by a transversal. If one corresponding angle is  $72^\circ$ , what is the other corresponding angle?



- ☐ A.  $72^\circ$  ☐ C.  $118^\circ$   
☐ B.  $108^\circ$  ☐ D.  $144^\circ$
- 4) A student incorrectly solved: "If legs are 5 and 12, then hypotenuse =  $5 + 12 = 17$ ." What is the error and the correct answer?
- ☐ A. Correct: hypotenuse is 17 ☐ C. Error: student forgot to square root.  
☐ B. Error: student added instead of squaring. Correct hypotenuse is 13 ☐ D. Error: student computed  $5 \times 12 = 60$  instead
- 5) Among 180 volunteers at an event, 108 are adults and 72 are youth. Of the adults, 81 worked the morning shift. What is the relative frequency of morning-shift workers among adults?
- ☐ A. 0.45 ☐ C. 0.75  
☐ B. 0.60 ☐ D. 0.85



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

☐ A. 2

☐ C. 3

☐ B. 2.4

☐ D. 6

7) A number is chosen randomly from 1 to 10. What is the probability of choosing a prime number OR an even number?

☐ A.  $\frac{7}{10}$

☐ C.  $\frac{5}{10}$

☐ B.  $\frac{4}{5}$

☐ D.  $\frac{6}{10}$

8) A library is awarding 3 different prizes to students: first place, second place, and third place. There are 8 students eligible. How many ways can the prizes be awarded?

☐ A.  $8 \times 7 \times 6 = 336$

☐ C.  $8^3 = 512$

☐ B.  $\binom{8}{3} = 56$

☐ D.  $8 + 7 + 6 = 21$

9) Between which two consecutive integers does  $\sqrt[3]{100}$  lie?

☐ A. 2 and 3

☐ C. 3 and 4

☐ B. 5 and 6

☐ D. 4 and 5

10) What is  $9.0 \times 10^{-5}$  in standard form?

☐ A. 90,000

☐ C. 0.00009

☐ B. 0.9

☐ D. 0.000009

### Number Sorting

$\pi, \sqrt{4}, 0.\bar{5}, -2.5, \sqrt{11}$

How many are rational?

11)

☐ A. One ( $\sqrt{4}$  only)

☐ C. Three ( $\sqrt{4}, 0.\bar{5}$ , and  $-2.5$ )

☐ B. Two ( $\sqrt{4}$  and  $0.\bar{5}$ )

☐ D. Four (all but  $\pi$  or  $\sqrt{11}$ )



1) 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.

2) Solve the system  $\begin{cases} 3x - 2y = 4 \\ x + 2y = 8 \end{cases}$  by elimination.

3) Expand  $(2x - 5)(3x - 2)$ .

☐ A.  $5x^2 - 19x + 10$

☐ C.  $6x^2 - 4x - 15x - 10$

☐ B.  $6x^2 - 10$

☐ D.  $6x^2 - 19x + 10$

4) A piggy bank has nickels and dimes totaling \$2.75. There are twice as many dimes as nickels. How many nickels are in the bank?

5) Triangle  $LMN$  has vertices  $L(2, 1)$ ,  $M(5, 1)$ , and  $N(3, 5)$ . The triangle is translated right 4 units and down 2 units. What is the image of vertex  $M$ ?

☐ A.  $(9, 1)$

☐ C.  $(1, 1)$

☐ B.  $(9, -1)$

☐ D.  $(1, 3)$



- 6) If  $g(x) = x^2 + 2$  and  $g(x) = 11$ , find the possible values of  $x$ .

- 7) Two students sketch different trend lines through the same scatter plot. Student A's line has a gentler slope, while Student B's line has a steeper slope. What could explain this difference?

- ☐ A. One student made a calculation error
- ☐ B. The students used different data sets
- ☐ C. Only one line can ever be correct
- ☐ D. Sketching a trend line by eye allows for reasonable variation

- 8) Two similar triangles have corresponding sides in the ratio 2 : 7. The smaller triangle has a side of 6 cm. Find the length of the corresponding side in the larger triangle.



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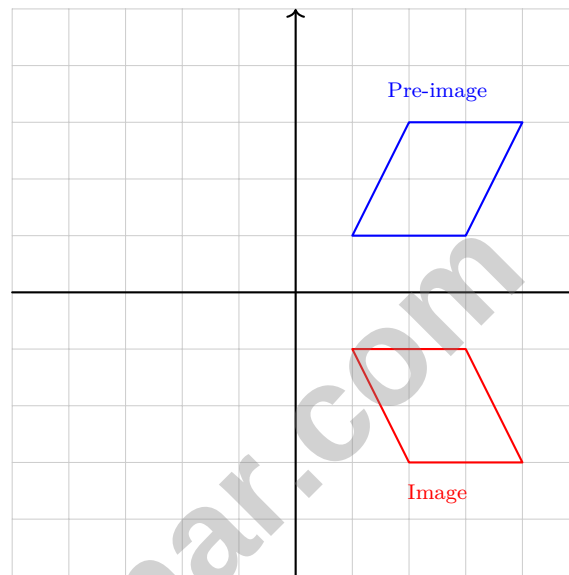
1) Pentagon PQRST is congruent to pentagon UVWXY. If side  $PQ = 8$  cm, what is the length of the corresponding side in the second pentagon?

☐ A. 4 cm

☐ C. 16 cm

☐ B. 8 cm

☐ D. Cannot be determined



2)

The figure shows a transformation. If this is a reflection across the  $x$ -axis, which vertex of the pre-image corresponds to the vertex at  $(3, -1)$  in the image?

☐ A.  $(1, 1)$

☐ C.  $(4, 3)$

☐ B.  $(3, 1)$

☐ D.  $(2, 3)$

3) Solve by elimination: 
$$\begin{cases} 2x + 3y = 11 \\ 2x - y = 3 \end{cases}$$

☐ A.  $(1, 3)$

☐ C.  $(3, 1)$

☐ B.  $(2, \frac{7}{3})$

☐ D.  $(\frac{5}{2}, 2)$



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4) Expand  $(2x + 3)^2$ .

☐ A.  $4x^2 + 9$

☐ B.  $4x^2 + 6x + 9$

☐ C.  $4x^2 + 12x + 9$

☐ D.  $2x^2 + 12x + 9$

5) A line has slope  $-2$  and passes through  $(1, 4)$ . What is its  $y$ -intercept?

6) The inequality has  $x$ -intercept 6 and  $y$ -intercept  $-3$ . The boundary line passes through both. Which inequality has shading that includes the origin?

☐ A.  $x - 2y \leq 6$

☐ B.  $x - 2y \geq 6$

☐ C.  $2y - x \leq 6$

☐ D.  $2y - x \geq 6$

7) Which ordered pair, if added to  $\{(1, 2), (2, 4), (3, 6)\}$ , would make it NOT a function?

☐ A.  $(4, 8)$

☐ B.  $(3, 8)$

☐ C.  $(2, 4)$

☐ D.  $(5, 10)$

8) Missing value problem: Function through  $(2, 9)$  and  $(5, 24)$  has what equation?

☐ A.  $y = 5x - 1$

☐ B.  $y = 5x + 1$

☐ C.  $y = 3x + 3$

☐ D.  $y = 6x - 3$

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.  $T = 12m + 8$

☐ B.  $T = 8m + 12$

☐ C.  $T = 20m$

☐ D.  $T = 8m - 12$



**Iowa ISASP 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 Iowa ISASP practice test.**

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## Practice Test Answers and Explanations

### Practice Test 1 Answers and Explanations

- 1) **Choice C is correct.** **(8.G.A.1)** A translation slides a figure without changing its orientation, producing a congruent image. Reflections flip, rotations turn, and dilations resize.
- 2) **Choice B is correct.** **(8.SP.A.2)** Using two points on the trend line,  $\text{slope} = \frac{\Delta y}{\Delta x} = \frac{9-1}{8-0.67} \approx 1.2$  km/week.
- 3) **Choice A is correct.** **(8.G.A.5)** Corresponding angles formed by parallel lines and a transversal are congruent.
- 4) **Choice B is correct.** **(8.G.B.6, 8.G.B.7)** Correct:  $5^2 + 12^2 = 25 + 144 = 169$ , so  $c = 13$ . The error was adding legs directly instead of applying the Pythagorean Theorem.
- 5) **Choice C is correct.** **(8.SP.A.4)** Relative frequency among adults:  $\frac{81}{108} = 0.75$ . This is row-conditional.
- 6) **Choice B is correct.** **(8.G.B.8)** Mean = 6. Absolute deviations:  $|2 - 6| = 4$ ,  $|4 - 6| = 2$ ,  $|6 - 6| = 0$ ,  $|8 - 6| = 2$ ,  $|10 - 6| = 4$ . Sum = 12. MAD =  $12/5 = 2.4$ .
- 7) **Choice B is correct.** **(8.G.C.9)** 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.  $P = \frac{8}{10} = \frac{4}{5}$ .
- 8) **Choice A is correct.** **(8.NS.A.2)** First place: 8 choices. Second place: 7 remaining students. Third place: 6 remaining students. Total:  $8 \times 7 \times 6 = 336$  ways.
- 9) **Choice D is correct.** **(8.NS.A.2)**  $4^3 = 64$  and  $5^3 = 125$ . Since  $64 < 100 < 125$ , we have  $4 < \sqrt[3]{100} < 5$ .
- 10) **Choice C is correct.** **(8.EE.A.3)** Move the decimal 5 places to the left:  $9.0 \times 10^{-5} = 0.00009$ .
- 11) **Choice C is correct.** **(8.NS.A.1)**  $\sqrt{4} = 2$  (rational),  $0.\bar{5} = \frac{5}{9}$  (rational), and  $-2.5 = -\frac{5}{2}$  (rational). The irrational numbers are  $\pi$  and  $\sqrt{11}$  (non-perfect square).
- 12) **Choice D is correct.** **(8.NS.A.1)** Let  $x = 0.\overline{654} = 0.65454\dots$ . Then  $10x = 6.\overline{54}$  and  $1000x = 654.\overline{54}$ . Subtracting:  $990x = 648$ , so  $x = \frac{648}{990} = \frac{36}{55}$ .
- 13) **Choice D is correct.** **(8.NS.A.2)**  $\pi \approx 3.14$  and  $\sqrt{5} \approx 2.24$ , so  $3.14 + 2.24 = 5.38 \approx 5.4$ .
- 14) **Choice A is correct.** **(8.EE.B.6)** Parallel lines have equal slopes. Both equations have slope 2.
- 15) **Choice C is correct.** **(8.EE.C.7)** The left side equals the right side for all values of  $x$ . This is an identity.
- 16) **The correct answer is 5.** **(8.F.B.4)** Slope:  $\frac{17-9}{3-1} = \frac{8}{2} = 4$ . Using  $(1, 9)$ :  $9 = 4(1) + b \Rightarrow b = 5$ .
- 17) **The correct answer is  $(-6, -4)$ .** **(8.G.A.3)** Using  $(x, y) \rightarrow (-y, x)$ :  $(-4, 6) \rightarrow (-6, -4)$ .
- 18) **Choice A is correct.** **(8.EE.C.7)** Multiply by  $\frac{3}{2}$ :  $x \geq -6$ .
- 19) **Choice B is correct.** **(8.F.A.1)** Each input  $(2, 3, 4)$  maps to exactly one output  $(4, 5, 6)$ . The other sets have repeated inputs.
- 20) **The correct answer is A, C.** **(8.F.A.2)** A is correct because the coefficient of  $x$  is  $\frac{2}{3}$ . C is correct because  $\frac{9-5}{3-1} = 2$ . B has slope  $\frac{2}{3}$ , D has slope  $\frac{4}{5}$ , and E has slope 2, so those statements are false.
- 21) **Choice D is correct.** **(8.G.C.9)** Solve for  $r$ :  $450 = 3000 \times r \times 3 \Rightarrow r = \frac{450}{9000} = 0.05 = 5\%$ .
- 22) **Choice C is correct.** **(8.EE.A.1)** When exponents are equal:  $\frac{t^9}{t^9} = t^{9-9} = t^0 = 1$  (for  $t \neq 0$ ).
- 23) **Choice D is correct.** **(8.EE.A.2)**  $13 \times 13 = 169$ , so  $\sqrt{169} = 13$ .
- 24) **Choice C is correct.** **(8.EE.A.4)** Divide:  $\frac{1.5 \times 10^{11}}{3.8 \times 10^8} \approx \frac{1.5}{3.8} \times 10^3 \approx 0.39 \times 10^3 = 3.9 \times 10^2$ .
- 25) **The correct answer is 189.25.** **(8.EE.B.6)** Rectangle =  $15 \times 10 = 150$  ft<sup>2</sup>. Semicircle =  $\frac{1}{2} \times 3.14 \times 5^2 = 39.25$  ft<sup>2</sup>. Total =  $150 + 39.25 = 189.25$  ft<sup>2</sup>.
- 26) **Choice D is correct.** **(8.EE.B.5)** Check ratio:  $(2, 6) \rightarrow 6/2 = 3$  and  $(4, 12) \rightarrow 12/4 = 3$ . Same ratio means proportional. Choice D has  $k = 3$ .
- 27) **Choice B is correct.** **(8.F.A.3)** The  $y$ -differences are  $16 - 10 = 6$ ,  $22 - 16 = 6$ ,  $28 - 22 = 6$ . Since  $x$  changes by 2 each time, the rate of change is  $\frac{6}{2} = 3$ , constant and linear.



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- **Breathe:** Reset before a difficult page.
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- **Return:** Come back to skipped questions with fresh eyes.
- **Finish Strong:** Use the last minutes to check.

**Grade 8 test-day tip:** Practice a simple reset: pause, breathe, reread, then choose your next step.

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**Jay Daie**

Your Test-Stamina Coach

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