

6 Illinois IAR

GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving For
Comprehensive Assessment Programs



6 PRINTED
TESTS



2 ONLINE
TESTS



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

6 Illinois IAR Grade 8 Math Practice Tests

Grade 8 Practice Rounds for Algebraic Thinking, Geometry, and Data Skills



Six complete 40-question Grade 8 IAR 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, Illinois Grade 8 Problem Solver!

Six focused rounds for sharper IAR math thinking

This book gives you six full Grade 8 IAR 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 Illinois 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 six-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.

Illinois 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?

Six IAR tests, 240 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 4–6	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
Answer Pages	Compact keys and explanations that show why each answer works.

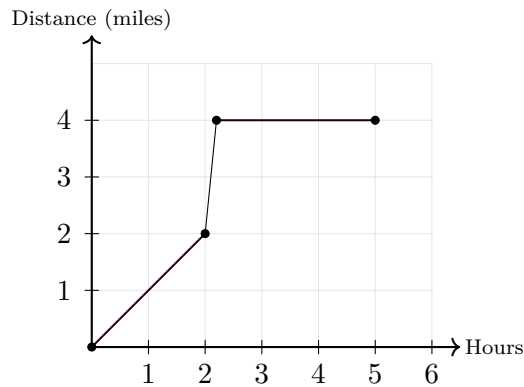
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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1)

A traveler's distance graph shows: 0 to 2 hours rising, then a jump, then flat. What does the jump represent?

- | | |
|--|--|
| ☐ A. The traveler rested without moving | ☐ C. This graph cannot represent a real physical scenario (discontinuity) |
| ☐ B. The traveler waited at the same distance | ☐ D. The traveler went backward in distance |

Number Sorting

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

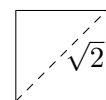
How many are rational?

2)

- | | |
|--|---|
| ☐ 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 π or $\sqrt{11}$) |



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Side = 1

3)

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☐ C. Between 2 and 3☐ B. Between 3 and 4☐ D. Between 1 and 24) Which is the best estimate of $\sqrt{48}$?☐ A. 6.5☐ C. 6.9☐ B. 7.0☐ D. 8.2

5) A credit card statement shows a beginning balance of \$500, new purchases of \$300, a payment of \$200, and interest of \$15. What is the ending balance?

☐ A. \$500☐ C. \$615☐ B. \$600☐ D. \$8006) What is 10^{-2} ?☐ A. 100☐ C. 0.01☐ B. -100☐ D. -0.01

7) A cube has a volume of 343 cubic units. What is the length of one edge of the cube?

☐ A. 6 units☐ C. 8 units☐ B. 9 units☐ D. 7 units

8) Convert 42,000 to scientific notation.

☐ A. 4.2×10^3

☐ C. 42×10^2

☐ B. 4.2×10^5

☐ D. 4.2×10^4

9) A student multiplies $(3.5 \times 10^4) \times (2 \times 10^3)$ and gets 7×10^7 . Which is true?

☐ A. The exponents should be multiplied to get 10^{12} .☐ C. The student is correct.☐ B. The coefficient is wrong; should multiply as $3.5 \times 2 = 7$, not separate.☐ D. The coefficient should be changed to 0.7.

10) Which equation represents a proportional relationship?

☐ A. $y = 2x + 3$

☐ C. $y = x - 1$

☐ B. $y = \frac{1}{2}x + 2$

☐ D. $y = -5x$

11) Solve by substitution: $\begin{cases} y = 2x - 5 \\ 4x - y = 7 \end{cases}$

☐ A. $(1, -3)$

☐ C. $(3, 1)$

☐ B. $(2, -1)$

☐ D. $(4, 3)$



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1) Expand $(x + 5)^2$.

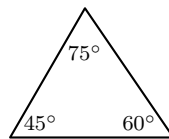
☐ A. $x^2 + 10x + 25$

☐ B. $x^2 + 25$

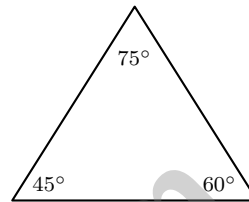
☐ C. $x^2 + 5x + 25$

☐ D. $x^2 + 10x + 10$

2) Two triangles both have angles measuring 45° , 60° , and 75° . Are these triangles necessarily similar?



Triangle 1



Triangle 2

☐ A. No, the sides must also be proportional

☐ B. No, only two angles are given

☐ C. Yes, angles alone determine similarity (AAA)

☐ D. Only if the triangles are congruent

3) A ladder is 17 feet long. When leaned against a wall, the base is 8 feet away from the wall. How far up the wall does the ladder reach?

4) If each exterior angle of a regular polygon is 18° , what is the polygon?

☐ A. 15-sided polygon

☐ B. 18-sided polygon

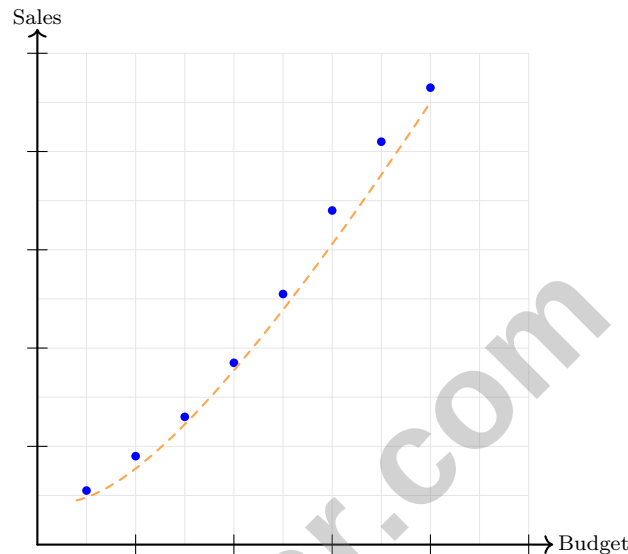
☐ C. 20-sided polygon

☐ D. 24-sided polygon



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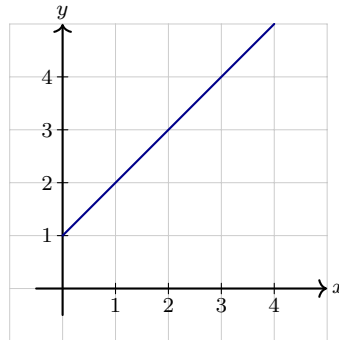
- 5) A scatter plot of advertising budget (thousands of dollars) versus sales revenue (thousands) displays a curved, accelerating upward pattern. Initially, each dollar spent increases sales by 10 dollars; later, each dollar spent increases sales by 25 dollars. Which term describes this relationship?



- ☐ A. Nonlinear (power or exponential) association ☐ C. Moderate negative correlation
- ☐ B. Weak positive correlation ☐ D. Perfect linear relationship
- 6) Two cities are located at $(1, 3)$ and $(7, 11)$ on a map. If each unit represents 2 miles, what is the distance between the cities in miles?



1) Which graph represents a LINEAR function?



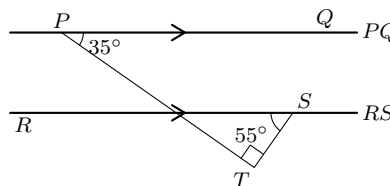
- ☐ A. No, the relationship is not a function
☐ B. Yes, the graph is a straight line
☐ C. No, the slope is positive
☐ D. Yes, it passes through the origin

2) $S(m) = 500 + 25m$ and table $(0, \$600)$, $(3, \$675)$, $(6, \$750)$. Which starts with more money?

m	0	3	6
Table function	\$600	\$675	\$750

- ☐ A. S
☐ B. Table function
☐ C. Both same.
☐ D. Cannot be determined.

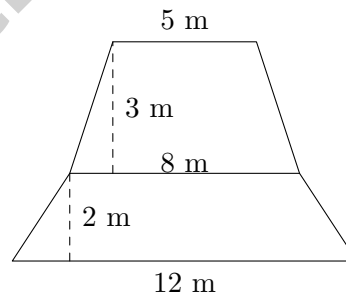
3) In the figure, $PQ \parallel RS$. If angle $QPT = 35^\circ$ and angle $RST = 55^\circ$, find angle PTS .



- ☐ A. 90°
☐ B. 100°
☐ C. 110°
☐ D. 120°



- 4) Which formula correctly calculates the sum of interior angles of a polygon with n sides?
- ☐ A. $180n$ ☐ C. $\frac{n \times 180}{2}$
- ☐ B. $(n - 2) \times 180$ ☐ D. $360n$
- 5) Pentagons $ABCDE$ and $FGHIJ$ are similar. Side $AB = 7$ cm and the corresponding side $FG = 14$ cm. If $BC = 9$ cm, what is the length of GH ?
- ☐ A. 4.5 cm ☐ C. 9 cm
- ☐ B. 18 cm ☐ D. 11.5 cm
- 6) An angle and its complement differ by 12° . What is the measure of the larger of the two angles?
- ☐ A. 39° ☐ C. 51°
- ☐ B. 45° ☐ D. 63°
- 7) A composite figure is an asymmetric shape made of two trapezoids stacked vertically. Top trapezoid: bases 5 m and 8 m, height 3 m. Bottom trapezoid: bases 8 m and 12 m, height 2 m. What is the combined area?



- ☐ A. 15 m^2 ☐ C. 35 m^2
- ☐ B. 20 m^2 ☐ D. 39.5 m^2



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Illinois IAR 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 Illinois IAR practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice C is correct.** **(8.F.B.5)** A jump discontinuity in a distance-time graph would mean the distance changes suddenly without showing the travel in between, which is not physically realistic for normal motion. A real distance-time graph should change continuously.
- 2) **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 π and $\sqrt{11}$ (non-perfect square).
- 3) **Choice D is correct.** **(8.NS.A.2)** Since $1^2 = 1$ and $2^2 = 4$, and $1 < 2 < 4$, we have $1 < \sqrt{2} < 2$.
- 4) **Choice C is correct.** **(8.NS.A.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.
- 5) **Choice C is correct.** **(8.G.B.7)** Ending balance = $\$500 + \$300 - \$200 + \$15 = \$615$.
- 6) **Choice C is correct.** **(8.EE.A.1)** $10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01$.
- 7) **Choice D is correct.** **(8.EE.A.2)** If the volume is 343 cubic units, then $e^3 = 343$, so $e = \sqrt[3]{343} = 7$ units.
- 8) **Choice D is correct.** **(8.EE.A.3)** Move the decimal 4 places left to get 4.2; the exponent is positive 4. Thus $42,000 = 4.2 \times 10^4$.
- 9) **Choice C is correct.** **(8.EE.A.4)** $3.5 \times 2 = 7$ and $10^{4+3} = 10^7$, giving 7×10^7 . The coefficient 7 is already in standard form $[1, 10]$, so no renormalization is needed.
- 10) **Choice D is correct.** **(8.EE.B.5)** A proportional equation has the form $y = kx$ (passes through origin, no constant term). Only $y = -5x$ fits this form.
- 11) **Choice A is correct.** **(8.EE.C.8a)** Substitute $y = 2x - 5$ into $4x - y = 7$: $4x - (2x - 5) = 7$, so $2x + 5 = 7$ and $x = 1$. Then $y = 2(1) - 5 = -3$, so the solution is $(1, -3)$.
- 12) **Choice A is correct.** **(8.F.B.4)** Slope: $m = \frac{5-1}{3-1} = \frac{4}{2} = 2$. Using point $(1, 1)$: $1 = 2(1) + b \Rightarrow b = -1$. Equation: $y = 2x - 1$.
- 13) **The correct answer is 0.1.** **(8.SP.A.2)** Compute $1.2 - 1.1 = 0.1$.
- 14) **Choice A is correct.** **(8.EE.B.5)** Line M: slope = $\frac{5}{2} = 2.5$. Line N: slope = $\frac{6}{3} = 2$. Since $2.5 > 2$, line M is steeper.
- 15) **The correct answer is 5.** **(8.G.B.8)** Absolute deviations: $|72 - 80| = 8$, $|78 - 80| = 2$, $|75 - 80| = 5$, $|81 - 80| = 1$, $|84 - 80| = 4$, $|90 - 80| = 10$. Sum = 30. MAD = $30/6 = 5$.
- 16) **Choice A is correct.** **(8.EE.C.8c)** "Sum" translates to $x + y = 20$. "Difference" translates to $x - y = 4$ (or $y - x = 4$, depending on order). Options B, C, and D do not match these descriptions.
- 17) **Choice A is correct.** **(8.F.A.1)** Solve $5x - 3 = 12$: add 3 to both sides to get $5x = 15$, so $x = 3$.
- 18) **Choice B is correct.** **(8.G.C.9)** Base area = $4^2 = 16 \text{ cm}^2$. Four triangular faces each have area $\frac{1}{2}(4)(6) = 12 \text{ cm}^2$, so the lateral area is 48 cm^2 . Total surface area = $16 + 48 = 64 \text{ cm}^2$.
- 19) **Choice A is correct.** **(8.G.A.1)** Consecutive translations are additive. If you move by (a, b) then by (c, d) , the net effect is $(a + c, b + d)$. Example: $(1, 2) + (3, 4) = (4, 6)$.
- 20) **Choice A is correct.** **(8.EE.B.6)** Using points $(1, -1)$ and $(5, 3)$: slope = $\frac{3 - (-1)}{5 - 1} = \frac{4}{4} = 1$.
- 21) **The correct answer is A, C.** **(8.G.A.4)** Correct: (A) All linear measurements (sides, perimeter) are multiplied by 2.5. (C) Area is multiplied by $(2.5)^2 = 6.25$. Incorrect: (B) Angles are congruent in dilation, not scaled. (D) Perimeter is multiplied, not divided, by 2.5. (E) Dilation preserves shape; polygon type does not change.
- 22) **Choice D is correct.** **(8.EE.C.7)** Find common denominator (6): $\frac{3y}{6} + \frac{2y}{6} = 10 \Rightarrow \frac{5y}{6} = 10$. Multiply by 6: $5y = 60$. Divide by 5: $y = 12$.
- 23) **Choice C is correct.** **(8.EE.C.8b)** Multiply by -1 (FLIP): $x \geq -5$.
- 24) **Choice A is correct.** **(8.EE.C.8b)** Dashed horizontal line at $y = 1$ with shading ABOVE (in the positive y direction) means $y > 1$.
- 25) **Choice B is correct.** **(8.G.C.9)** $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 216 = 904.32 \text{ mm}^3$.



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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 6 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. ACHIEVE TOMORROW.

6

Give your child the confidence and skills they need with **6 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 |
| | ✓ And More! |



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2 ONLINE TESTS



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