

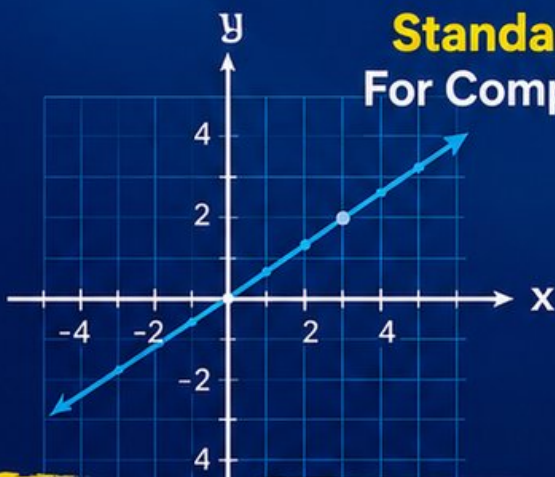
9

Illinois
IAR

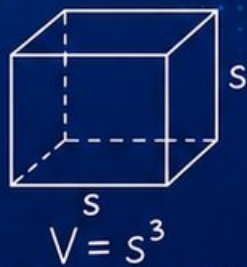
Grade 8

MATH

PRACTICE TESTS

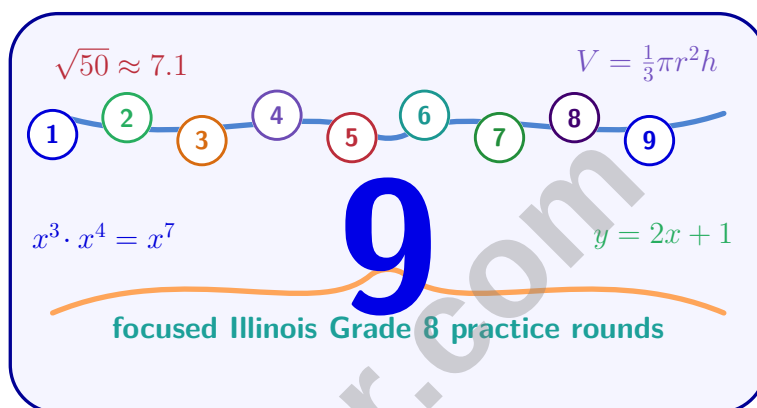
Standards Aligned Problem Solving
For Comprehensive Assessment Programs

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

9 PRINTED
TESTS2 ONLINE
TESTSUse these **two additional online practice tests** for extra review after the printed tests in this book.

9 Illinois IAR Grade 8 Math Practice Tests

Illinois Practice Rounds for Real Numbers, Functions, Geometry, and Data Fluency



Nine 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!

Nine focused rounds for sharper IAR math thinking

This book gives you nine 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 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.

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?

Nine IAR 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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- 1) A gym offers two membership plans. Plan A costs \$50 upfront plus \$10 per month. Plan B costs \$20 per month with no upfront fee. After how many months do the total costs equal?

- ☐ A. 3 months ☐ C. 5 months
☐ B. 4 months ☐ D. 6 months

- 2) Calculate the Mean Absolute Deviation for the data set $\{5, 10, 15, 20\}$.

- 3) Solve for x : $5x - 3 = 2x + 9$

- ☐ A. $x = 2$ ☐ C. $x = 6$
☐ B. $x = 12$ ☐ D. $x = 4$

- 4) A virus has diameter 1.2×10^{-7} m. Bacteria has diameter 8×10^{-6} m. How many times larger is the bacterium than the virus?

- 5) A translation moves a point from (a, b) to $(a + 5, b - 3)$. If another point moves from $(-2, 4)$ to some image point using the same translation, what is the image point?

- ☐ A. $(3, 1)$ ☐ C. $(-7, 1)$
☐ B. $(3, 7)$ ☐ D. $(-2, 1)$



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6) Sarah wants to buy a car for \$15,000. She can pay cash or finance it at 7% APR over 5 years. What is the total finance cost (interest only)?

☐ A. \$1,050

☐ C. \$5,250

☐ B. \$2,100

☐ D. \$10,500

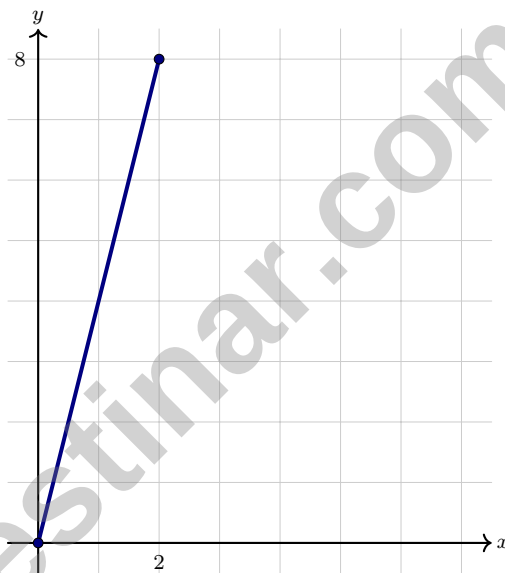
7) Estimate $\sqrt{99}$ to the nearest integer.

☐ A. 8

☐ C. 10

☐ B. 9

☐ D. 11



8)

What is the slope of the line?

☐ A. 2

☐ C. 8

☐ B. 16

☐ D. 4



9) Solve:
$$\begin{cases} 4x - 3y = 5 \\ x = 2 \end{cases}$$

☐ A. $(2, 1)$

☐ B. $(2, -1)$

☐ C. $(2, \frac{1}{3})$

☐ D. $(2, 3)$

10) Which inequality represents “the product of a number and -2 is greater than 8 ”?

☐ A. $-2x > 8$

☐ B. $2x > 8$

☐ C. $-2x < 8$

☐ D. $x > -4$

11) Factor $x^2 - 13x + 42$.

☐ A. $(x - 6)(x - 7)$

☐ B. $(x - 14)(x + 1)$

☐ C. $(x - 21)(x - 2)$

☐ D. $(x - 3)(x - 14)$

12) For $-x + 2y > 4$, after rewriting to slope-intercept form $y > \frac{1}{2}x + 2$, which description matches the graph?

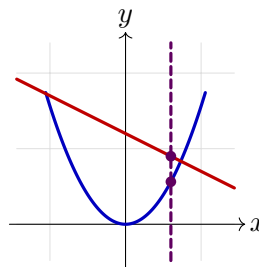
☐ A. Dashed line, shade above

☐ B. Dashed line, shade below

☐ C. Solid line, shade above

☐ D. Solid line, shade below

13) Two curves are drawn on the same coordinate plane. The first curve is a parabola, and the second is a straight line (not vertical). How many times will a vertical line intersect both curves combined?



☐ A. At most twice (once per curve).

☐ B. Exactly once.

☐ C. At most three times.

☐ D. More than four times.



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1) If a data set has a small MAD, what does this tell us about the data?

- ☐ A. The data is clustered close to the mean ☐ C. The data has no mean
☐ B. The data is widely spread out ☐ D. The data must all be positive

Explain: Why does a small MAD indicate consistency?

2) Use the table to find the value of x if $f(x) = 7$.

x	0	1	2	3
$f(x)$	1	3	5	7

3) The table below shows preferences for sports among 100 students.

	Football	Basketball	Total
Boys	35	20	55
Girls	15	30	45
Total	50	50	100

How many boys prefer basketball?

- ☐ A. 15 ☐ C. 35
☐ B. 20 ☐ D. 50



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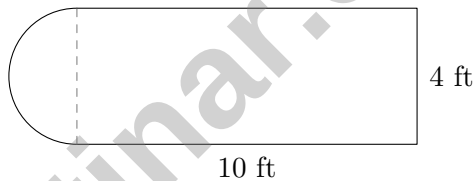
4) Which scatter plot pattern would suggest there is **no correlation** between two variables?

- ☐ A. Points scattered randomly with no visible pattern
- ☐ B. Points forming a clear upward trend
- ☐ C. Points forming a clear downward trend
- ☐ D. Points concentrated along a single line

5) A decorative shape consists of a cube with side 5 cm topped with a square pyramid (same base, height 5 cm). Which choice is closest to the total volume?

- ☐ A. 125 cm^3
- ☐ B. 166 cm^3
- ☐ C. 208 cm^3
- ☐ D. 250 cm^3

6) A composite figure is a rectangle (10 ft by 4 ft) with a semicircle attached on one end (diameter 4 ft). What is the total area? Use $\pi \approx 3.14$.

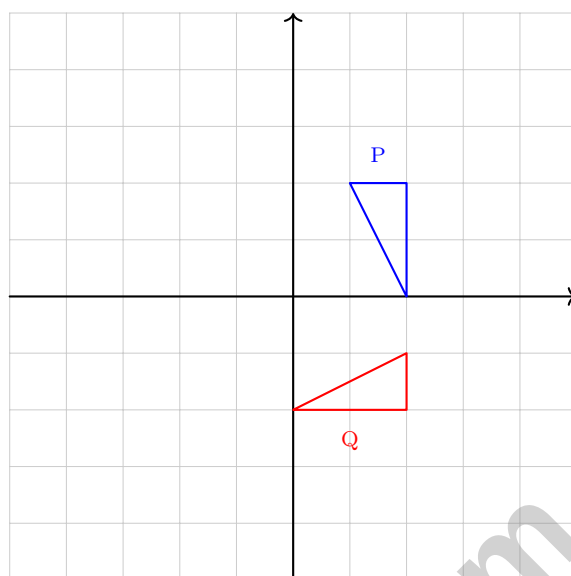


- ☐ A. 40 ft^2
- ☐ B. 46.28 ft^2
- ☐ C. 52.56 ft^2
- ☐ D. 58.84 ft^2

7) A student uses the model $G = 0.5a + 60$ to predict grades based on assignment score a . The model predicts a grade of 85, but the student actually earns 82. Which statement is correct?

- ☐ A. The residual is 3 (model overestimated)
- ☐ B. The residual is -3 (model overestimated)
- ☐ C. The residual is 0 (perfect prediction)
- ☐ D. The model has a slope error





1)

Triangle P is rotated 90° clockwise about the origin to produce triangle Q. Is this correct?

- ☐ A. Yes, the rotation is correct
 ☐ C. No, a 270° counterclockwise rotation would be needed
- ☐ B. No, a 90° counterclockwise rotation would be needed
 ☐ D. No, a 180° rotation would be needed

2) A cylindrical grain silo has a diameter of 10 feet and a height of 20 feet. The curved exterior wall must be painted. If paint costs \$2 per square foot, what is the total cost of paint needed? (Use $\pi \approx 3.14$.)

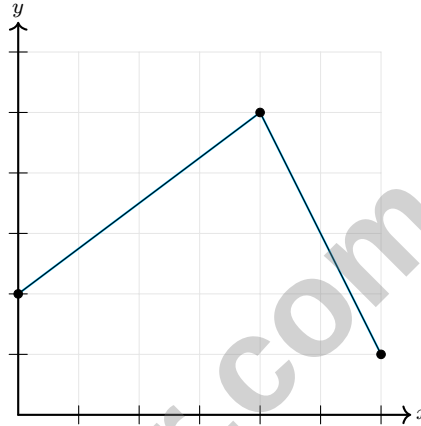
- ☐ A. \$314
 ☐ C. \$1,256
- ☐ B. \$628
 ☐ D. \$1,570



3) The table below shows costs. Identify whether the relationship is linear.

Quantity	1	2	3	4
Cost (\$)	12	24	36	48

- ☐ A. Yes, each item costs \$12 ☐ C. No, costs only go up
☐ B. No, the cost is too high ☐ D. Yes, because the total cost increases



4)

Which set of statements is true about the piecewise linear function?

- ☐ A. It increases from $x = 0$ to $x = 4$, decreases from $x = 4$ to $x = 6$, and has maximum value 5
☐ B. It has a zero at $x = 3$, decreases from $x = 4$ to $x = 6$, and has y -intercept 5
☐ C. It increases from $x = 0$ to $x = 6$, has maximum value 6, and has y -intercept 2
☐ D. It decreases from $x = 0$ to $x = 4$, has a zero at $x = 3$, and has maximum value 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.EE.C.8c) Let m = number of months. Plan A costs $50 + 10m$. Plan B costs $20m$. Setting equal: $50 + 10m = 20m$, so $50 = 10m$, giving $m = 5$ months.
- 2) **The correct answer is 5.** (8.G.B.8) Mean = 12.5. Deviations: $|5 - 12.5| = 7.5$, $|10 - 12.5| = 2.5$, $|15 - 12.5| = 2.5$, $|20 - 12.5| = 7.5$. Sum = 20. MAD = $20/4 = 5$.
- 3) **Choice D is correct.** (8.EE.C.7) Subtract $2x$ and add 3: $3x = 12$. Divide by 3: $x = 4$. (Distractor A: result of dividing 12 by 3 incorrectly; C: forgetting to distribute constant; D: result of incorrect arithmetic.)
- 4) **The correct answer is 66.67.** (8.EE.A.3) Divide: $\frac{8 \times 10^{-6}}{1.2 \times 10^{-7}} = \frac{8}{1.2} \times 10^1 = 6.67 \times 10^1 \approx 66.67$.
- 5) **Choice A is correct.** (8.G.A.1) Apply the translation rule to the second point: $(-2, 4) \rightarrow (-2 + 5, 4 - 3) = (3, 1)$.
- 6) **Choice C is correct.** (8.G.B.7) Interest: $I = 15000 \times 0.07 \times 5 = \$5,250$.
- 7) **Choice C is correct.** (8.EE.A.2) $9^2 = 81$ and $10^2 = 100$. Since 99 is very close to 100, $\sqrt{99} \approx 9.95 \approx 10$.
- 8) **Choice D is correct.** (8.EE.B.5) Slope = $\frac{8}{2} = 4$. The line passes through $(0, 0)$ and $(2, 8)$.
- 9) **Choice A is correct.** (8.EE.C.8a) Substitute $x = 2$ into $4x - 3y = 5$: $8 - 3y = 5$, so $-3y = -3$ and $y = 1$. The solution is $(2, 1)$.
- 10) **Choice A is correct.** (8.EE.C.8b) "Product of a number and -2 " is $-2x$; "greater than 8" is > 8 .
- 11) **Choice A is correct.** (8.EE.C.7) Find two numbers that multiply to 42 and add to -13 : -6 and -7 . Verify: $(-6)(-7) = 42$ and $-6 - 7 = -13$.
- 12) **Choice A is correct.** (8.EE.C.8b) The $>$ symbol (strict) gives a DASHED line. Since y is GREATER than the expression, shade ABOVE.
- 13) **Choice A is correct.** (8.F.A.1) A parabola passes the vertical line test (one intersection per vertical line). A non-vertical line also passes the vertical line test. A vertical line can intersect each at most once, for a total of at most two intersections.
- 14) **Choice B is correct.** (8.F.A.3) A nonlinear function's graph is curved, not straight. This curve shows accelerating growth, typical of a nonlinear relationship.
- 15) **Choice A is correct.** (8.F.B.5) The upward segment lasts 3 hours (0 to 3), and the downward segment also lasts 3 hours (5 to 8). Since the graph starts and ends at 0, the same height gained is later lost over the same amount of time, so the absolute values of the slopes are equal.
- 16) **Choice B is correct.** (8.G.A.2) Perimeter of Triangle 1 = $5 + 5 + 6 = 16$ cm. Even though Triangle 2 is oriented differently (rotated or reflected), congruent figures have equal corresponding sides. Therefore, Triangle 2 also has sides of 5 cm, 5 cm, and 6 cm, giving a perimeter of 16 cm.
- 17) **Choice A is correct.** (8.G.A.3) The rule for 270° counterclockwise rotation is $(x, y) \rightarrow (y, -x)$. So $(4, -3) \rightarrow (-3, -4)$.
- 18) **The correct answer is A, E.** (8.SP.A.1) A is correct because positive correlation means the variables tend to increase together. E is correct because a strong linear relationship supports using a line of best fit for predictions. B, C, and D overstate what a scatter plot can prove.
- 19) **Choice B is correct.** (8.G.A.5) When parallel lines are cut by a transversal, corresponding angles, alternate interior angles, and alternate exterior angles are all congruent.
- 20) **Choice D is correct.** (8.G.B.7) Total: 360° . Section B: 180° . So $P(B) = \frac{180}{360} = \frac{1}{2}$.
- 21) **Choice C is correct.** (8.NS.A.2) $4\pi \approx 4 \times 3.14 = 12.56$.
- 22) **Choice D is correct.** (8.EE.A.1) (D) is $x^6 + 1$, not x^6 , because addition is not an exponent law.
- 23) **Choice C is correct.** (8.EE.A.4) Divide: $\frac{2 \times 10^{12}}{4 \times 10^{12}} = \frac{2}{4} \times 10^0 = 0.5 \times 10^0 = 0.5$ kilotons.
- 24) **Choice B is correct.** (8.F.A.2) $S(15) = 150 + 40(15) = 750$. Competitor slope: $(700 - 500)/5 = 40$ per day. From day 5 point: $C(d) = 500 + 40(d - 5) = 40d + 300$, so $C(15) = 40(15) + 300 = 900$. Since $900 > 750$, Competitor has more.
- 25) **Choice A is correct.** (8.F.B.4) Slope is $m = \frac{212 - 32}{100 - 0} = \frac{180}{100} = 1.8$. Be careful to use change in F over change in C .
- 26) **Choice A is correct.** (8.G.B.6, 8.G.B.7) Using $a^2 + b^2 = c^2$: $20^2 + 21^2 = 400 + 441 = 841$, so $c = 29$ (the 20-21-29 triple).



Hi, Math Hero!

◇ This high-stamina book gave you nine substantial 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

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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