

Illinois

IAR

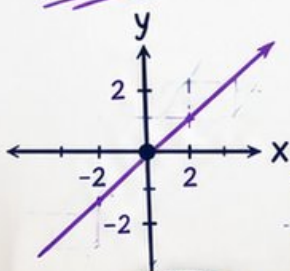
GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

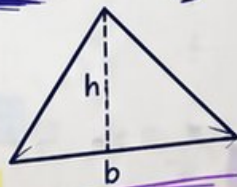
$$y = mx + b$$



**BUILD
CONFIDENCE.
SHARPEN SKILLS.
ACE YOUR
EXAM!**

Practice
Today
Succeed
Tomorrow!

$$A = \frac{1}{2}bh$$



7 PRINTED
TESTS



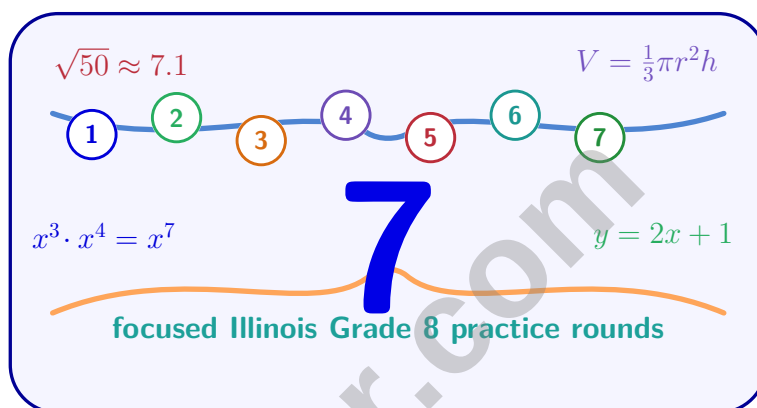
2 ONLINE
TESTS



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

7 Illinois IAR Grade 8 Math Practice Tests

Seven IAR Rounds for Real Numbers, Functions, and Data



Seven 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!

Seven focused rounds for sharper IAR math thinking

This book gives you seven 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 seven-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?

Seven IAR tests, 280 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.
Test 7	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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For more practice
& answers

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1) Solve:
$$\begin{cases} \frac{1}{4}x + y = 2 \\ x - y = 4 \end{cases}$$

☐ A. $(\frac{24}{5}, \frac{4}{5})$

☐ C. $(5, -1)$

☐ B. $(\frac{20}{3}, \frac{8}{3})$

☐ D. $(3, -1)$

2) Which of the following relations is a function?

☐ A. $\{(1, 2), (1, 3), (2, 4)\}$

☐ C. $\{(2, 5), (2, 6), (3, 7)\}$

☐ B. $\{(1, 2), (2, 3), (3, 4)\}$

☐ D. $\{(4, 1), (4, 2), (4, 3)\}$

3) Function f : “starts at 5, increases by 3 each unit.” Function g given in table: $(0, 10)$, $(1, 12)$, $(2, 14)$. Which has the greater y -intercept?

x	0	1	2
$g(x)$	10	12	14

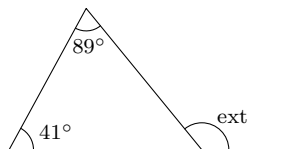
☐ A. Function f

☐ C. Both same.

☐ B. Function g

☐ D. Cannot compare.

4) A triangle has interior angles of 41° and 89° . What is the exterior angle adjacent to the third interior angle?



☐ A. 50°

☐ C. 130°

☐ B. 100°

☐ D. 180°



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5) If a polygon has an interior angle sum of 900° , how many sides does it have?

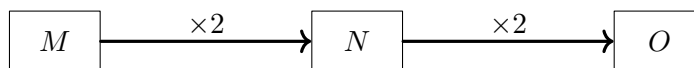
☐ A. 5

☐ C. 7

☐ B. 6

☐ D. 8

6) If Figure M is similar to Figure N with scale factor 2, and Figure N is similar to Figure O with scale factor 2, what is the scale factor from Figure M to Figure O ?



☐ A. 2

☐ C. $\frac{1}{2}$

☐ B. 4

☐ D. 1

7) A student graphs $y \geq x$ and mistakenly shades BELOW the line. What is the error?

☐ A. Should have used a dashed line

☐ C. Should have shaded BELOW the

☐ B. Should have shaded ABOVE the line

☐ D. Should have used the inequality $y < x$

8) Which is a NONLINEAR function?

☐ A. $y = 11x$

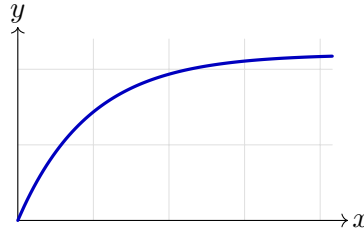
☐ C. $y = x^2 + 7$

☐ B. $y = -9 + x$

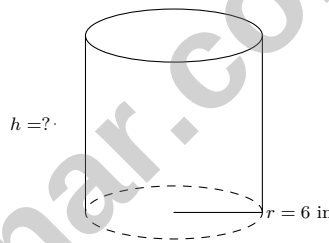
☐ D. $y = \frac{1}{2}x - 3$



- 9) Which real-world scenario matches: graph starts at origin, rises steeply, then gradually levels off?



- ☐ A. A plant growing slower and slower as it matures
☐ B. A car accelerating uniformly over time
☐ C. Water flowing out of a tank at constant rate
☐ D. A ball rolling down a ramp with no friction



10)

A cylinder has radius 6 in and volume 1695.6 in^3 . What is its height? (Use $\pi \approx 3.14$.)

- ☐ A. 7.5 in
☐ B. 15 in
☐ C. 10 in
☐ D. 20 in
- 11) Two complementary angles are in the ratio 3 : 7. What is the measure of the smaller angle?
- ☐ A. 18°
☐ B. 21°
☐ C. 27°
☐ D. 30°



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1) Multiply $(2 \times 10^3) \times (3 \times 10^2)$. Express in scientific notation.

☐ A. 60×10^5

☐ C. 5×10^5

☐ B. 6×10^6

☐ D. 6×10^5

2) Solve for x : $2(x + 3) = 3(x - 1)$

☐ A. $x = 9$

☐ C. $x = -3$

☐ B. $x = 3$

☐ D. $x = 1$

3) A line passes through $(1, 5)$ with slope $\frac{1}{2}$. What is the y -intercept?

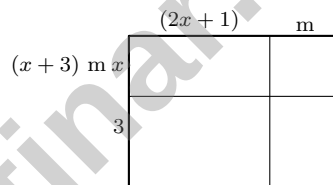
☐ A. 4

☐ C. 5

☐ B. $\frac{3}{2}$

☐ D. $\frac{9}{2}$

4) A garden is shaped like a rectangle with length $(2x + 1)$ m and width $(x + 3)$ m. What is its area in square meters?



☐ A. $2x^2 + 7x + 3$

☐ C. $3x^2 + 4x + 3$

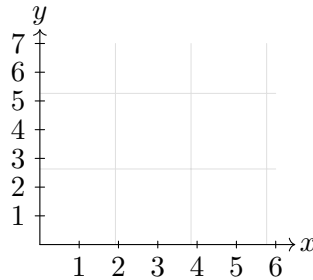
☐ B. $2x^2 + 3x + 7$

☐ D. $2x^2 + 6x + 3$

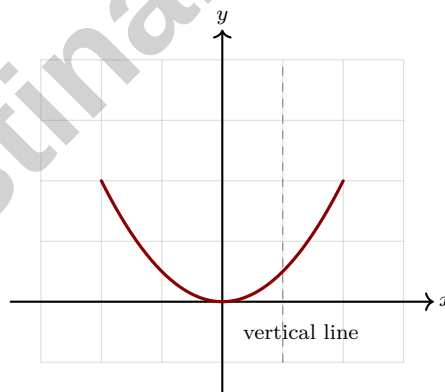
5) Calculate $\frac{9.6 \times 10^8}{3.2 \times 10^5}$ and express in scientific notation.



- 6) Graph the proportional relationship $y = \frac{3}{2}x$ by finding three points and identifying the slope. What is the slope?



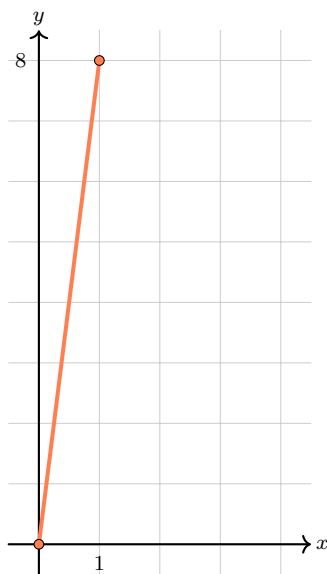
- 7) A vertical line test is performed on the graph below. How many times does a vertical line intersect the curve?



- ☐ A. Zero times (the line misses the curve).
 ☐ C. Twice (the line intersects at two points).
- ☐ B. Once (the line intersects at one point).
 ☐ D. More than twice.



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1)

What is the slope?

☐ A. 1☐ C. 8☐ B. 4☐ D. $\frac{1}{8}$ 2) The probability of rain tomorrow is $\frac{2}{5}$. What is the probability that it will NOT rain?☐ A. $\frac{3}{5}$ ☐ C. $\frac{1}{5}$ ☐ B. $\frac{5}{2}$ ☐ D. $\frac{2}{5}$

3) A two-way table shows 360 employees:

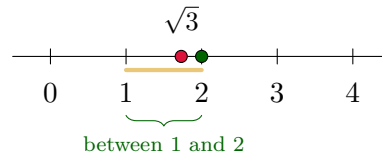
	Day Shift	Night Shift	Total
Salaried	144	96	240
Hourly	72	48	120
Total	216	144	360

What is the joint relative frequency of hourly night-shift workers?

☐ A. $\frac{48}{120}$ ☐ C. $\frac{48}{360}$ ☐ B. $\frac{48}{144}$ ☐ D. $\frac{120}{360}$

- 4) Two data sets both have 5 values and mean = 10: Set P: {8, 9, 10, 11, 12} Set Q: {1, 5, 10, 15, 19} Which set has the larger MAD?

- ☐ A. Set P
☐ B. Set Q
☐ C. Equal MAD
☐ D. Cannot compare



5)

Which statement is true?

- ☐ A. $\sqrt{3} > 2$
☐ B. $\sqrt{3} = 1.73$
☐ C. $\sqrt{3} < 2$
☐ D. $\sqrt{3}$ is rational

$0.\overline{142}$
 3-digit repeating block
Denominator: ?

6)

Based on the diagram, what is the denominator when $0.\overline{142}$ is converted?

- ☐ A. 99
☐ B. 142
☐ C. 999
☐ D. 1000

- 7) A right triangle has legs of length 3 and 5 units. Which integer range contains the hypotenuse length?

- ☐ A. Between 8 and 9
☐ B. Between 6 and 7
☐ C. Between 7 and 8
☐ D. Between 5 and 6



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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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& answers

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (8.EE.C.8a) From the second equation, $y = x - 4$. Substitute into the first: $\frac{1}{4}x + (x - 4) = 2$, so $\frac{5}{4}x = 6$, giving $x = \frac{24}{5}$. Then $y = \frac{24}{5} - 4 = \frac{24}{5} - \frac{20}{5} = \frac{4}{5}$.
- 2) **Choice B is correct.** (8.F.A.1) A relation is a function if every input has exactly one output. Option B's inputs 1, 2, 3 each appear once. The other options repeat inputs with different outputs.
- 3) **Choice B is correct.** (8.F.A.2) From verbal description, f has y -intercept 5. From table g , the y -intercept is 10. Since $10 > 5$, g is greater.
- 4) **Choice C is correct.** (8.G.A.5) The third interior angle is $180 - 41 - 89 = 50^\circ$. The exterior angle is $180 - 50 = 130^\circ$ (or sum of remote interior angles: $41 + 89 = 130^\circ$).
- 5) **Choice C is correct.** (8.G.A.5) Set $(n - 2) \times 180 = 900$. Then $n - 2 = 5$, so $n = 7$ (a heptagon).
- 6) **Choice B is correct.** (8.G.A.4) Composite scale factor: $2 \times 2 = 4$. Scaling is transitive.
- 7) **Choice B is correct.** (8.EE.C.8b) For $y \geq x$, the solution region is above the line. The boundary is solid because the inequality includes equality.
- 8) **Choice C is correct.** (8.F.A.3) $y = x^2 + 7$ has x squared, making it nonlinear (quadratic). The other three are linear functions in the form $y = mx + b$.
- 9) **Choice A is correct.** (8.F.B.5) Steep rise early (fast growth), then level off (approaching maximum) matches plant growth. B is linear, C is linear decrease, D accelerates (not levels off).
- 10) **Choice B is correct.** (8.G.C.9) From $V = \pi r^2 h$: $1695.6 = 3.14 \times 36 \times h \Rightarrow h = \frac{1695.6}{113.04} = 15$ in.
- 11) **Choice C is correct.** (8.G.B.7) If the angles are $3k$ and $7k$, then $3k + 7k = 90$, so $10k = 90$ and $k = 9^\circ$. The smaller angle is $3 \times 9 = 27^\circ$.
- 12) **Choice D is correct.** (8.G.B.7) Rectangle area $= 12 \times 8 = 96 \text{ ft}^2$. Each triangle area $= \frac{1}{2} \times 6 \times 4 = 12 \text{ ft}^2$. Two triangles $= 24 \text{ ft}^2$. Total $= 96 + 24 = 120 \text{ ft}^2$.
- 13) **Choice A is correct.** (8.SP.A.3) The slope is 75, meaning the account increases by \$75 each month.
- 14) **Choice B is correct.** (8.G.A.2) Congruent figures have equal perimeters. Since ABCDEF is congruent to GHIJKL, and the perimeter of ABCDEF is 48 cm, the perimeter of GHIJKL is also 48 cm.
- 15) **Choice D is correct.** (8.G.A.3) Reflection across $y = -x$ maps $(x, y) \rightarrow (-y, -x)$. Reversing: $(2, -5) \rightarrow (-(-5), -2) = (5, -2)$.
- 16) **Choice C is correct.** (8.G.B.6, 8.G.B.7) Check C: $7^2 + 9^2 = 49 + 81 = 130 \neq 121 = 11^2$. All others satisfy the Pythagorean Theorem (A: 9-12-15 is 3-4-5 scaled by 3; B: 6-8-10 is 3-4-5 scaled by 2; D: 20-21-29 is a Pythagorean triple).
- 17) **Choice A is correct.** (8.G.B.8) Using the Pythagorean Theorem: $c = \sqrt{8^2 + 6^2} = \sqrt{64 + 36} = \sqrt{100} = 10$ units.
- 18) **The correct answer is A,B.** (8.EE.B.6) Options A and B both have slope 4, making them parallel. Option C has slope -4 , option D has slope $\frac{1}{4}$, and option E has slope 2, so none of these match.
- 19) **Choice A is correct.** (8.G.C.9) $V = \frac{1}{3} \times 2.25 \times 10 = \frac{22.5}{3} = 7.5 \text{ m}^3$.
- 20) **Choice C is correct.** (8.SP.A.1) Most students show: more TV $\rightarrow$ lower GPA. This student breaks that pattern with high TV but also high GPA, making this point an outlier that deviates from the trend.
- 21) **Choice C is correct.** (8.SP.A.4) Marginal relative frequency for sports: $\frac{220}{400} = 0.55$. This is the column-total ratio.
- 22) **Choice C is correct.** (8.G.B.8) Absolute deviations: $|88 - 90| = 2$, $|92 - 90| = 2$, $|90 - 90| = 0$, $|86 - 90| = 4$, $|94 - 90| = 4$. Sum $= 12$. MAD $= 12/5 = 2.4$.
- 23) **Choice B is correct.** (8.G.B.7) With replacement: $P(\text{red and red}) = \frac{5}{8} \times \frac{5}{8} = \frac{25}{64}$.
- 24) **Choice B is correct.** (8.SP.A.2) Points nearly aligned on the line indicates high correlation, small residuals, and a strong linear model.
- 25) **Choice D is correct.** (8.NS.A.1) Square roots of perfect squares always yield whole numbers. For example, $\sqrt{36} = 6$, $\sqrt{49} = 7$, $\sqrt{100} = 10$. Whole numbers are integers and therefore rational.



Hi, Strategy Solver!

◇ Grade 8 math rewards students who think before they calculate. You practiced choosing strategies, not just hunting for answers. This broad and demanding book gave you seven strong Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** That matters because stronger math students do not use one method for every question. They notice the structure and choose the tool that fits. ★

Strategy Moves

- **Estimate:** Know the neighborhood of the answer.
- **Simplify:** Rewrite numbers in friendlier forms.
- **Model:** Draw what the words describe.
- **Verify:** Put the answer back into the problem.

Grade 8 test-day tip: Pause for ten seconds before hard questions. A short plan can save several minutes.

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

Jay Daie

Your Strategy Guide

PRACTICE TODAY SUCCEED TOMORROW!

Give your child the confidence and skills they need with **7 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!

GRADE 8

Practice
Today
Succeed
Tomorrow!

Algebra

Geometry

Statistics

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! |



2 EXTRA ONLINE PRACTICE TESTS INCLUDED!

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

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BUILD CONFIDENCE. SHARPEN SKILLS. ACE YOUR EXAM!