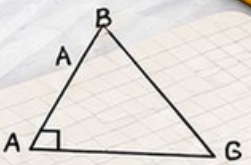
ILLINOIS IAR

GRADE 8 MATH PRACTICE TESTS

5 PRINTED TESTS

2 ONLINE TESTS



$a^2 + b^2 = c^2$

$y = mx + b$

Standards Aligned Problem Solving For Comprehensive Assessment Programs

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

5 Illinois IAR Grade 8 Math Practice Tests

Focused IAR Rounds for Graphs, Geometry, and Statistics

Five 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!

Five focused rounds for sharper IAR math thinking

This book gives you five 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.

How to Use This Book

A five-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?

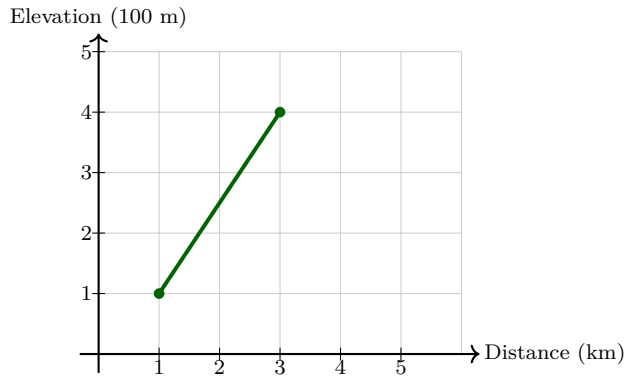
Five IAR tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	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.

Table of Contents

1) The graph shows elevation change during a hike.



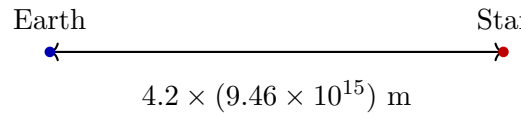
What is the slope of the line?

☐ A. $\frac{3}{4}$
☐ B. $\frac{2}{3}$
☐ C. $\frac{3}{2}$
☐ D. 2

2) Simplify $(y^4)^3$.

☐ A. y^7
☐ B. y^1
☐ C. y^{-12}
☐ D. y^{12}

3) A light-year is the distance light travels in one year, approximately 9.46×10^{15} meters. If a star is 4.2 light-years away, how many meters is it? (Express in scientific notation.)



☐ A. 39.7×10^{14} m
☐ B. 4.2×10^{15} m
☐ C. 3.97×10^{16} m
☐ D. 2.25×10^{16} m

4) Evaluate $(x+4)(x+8)$ when $x=1$.

5) A slower cyclist riding 12 mph has a 9-mile head start. A faster cyclist riding 15 mph starts from the same point and rides in the same direction. How long will it take the faster cyclist to catch up?

☐ A. 2 hours
☐ B. 2.5 hours
☐ C. 3 hours
☐ D. 4 hours

6) If $f(x)=x-3$ and $f(x)=5$, what is x?

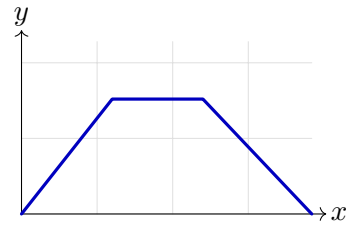
☐ A. 2
☐ B. 8
☐ C. 5
☐ D. 15

7) Table: $(0,3)$, $(1,1)$, $(2,-1)$, $(3,-3)$. Rate of change is?

x	0	1	2	3
y	3	1	-1	-3

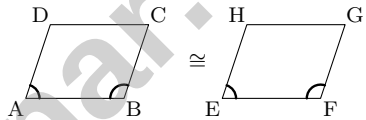
☐ A. -2
☐ B. -1
☐ C. 1
☐ D. 2

8) A graph of a function shows distance from home (in miles) vs. time. The graph rises, then is flat, then falls. Which real-world scenario matches?



☐ A. Drive somewhere, stop, then drive home
☐ B. Walk faster and faster until stopping
☐ C. Stay home, then drive faster
☐ D. Drive home directly from work

9) Two congruent quadrilaterals are shown. A student reasons: "Since two angles are equal, the quadrilaterals must be congruent." What is wrong with this reasoning?



☐ A. Two equal angles alone do NOT guarantee congruence
☐ B. Equal angles guarantee equal side lengths
☐ C. The student's reasoning is correct; angle equality proves congruence
☐ D. Congruent figures never have equal angles

10) If a triangle is dilated by scale factor $\frac{1}{3}$ centered at the origin and the original triangle has area 45 square units, what is the area of the dilated triangle?

☐ A. 15 square units
☐ B. 5 square units
☐ C. 135 square units
☐ D. 45 square units

1) A right triangle has legs of $\sqrt{2}$ and $\sqrt{2}$. What is the hypotenuse?

☐ A. 2
☐ B. $\sqrt{2}$
☐ C. 4
☐ D. $2\sqrt{2}$

2) The area of a square is $A = s^2$. If you square the side length, what is the area of the new square in terms of s?

☐ A. s^2
☐ B. s^3
☐ C. $(s^2)^2 = s^4$
☐ D. $2s^2$

3) $(5.2 \times 10^6) - (1.5 \times 10^6) = ?$

☐ A. 0.37×10^6
☐ B. 6.7×10^6
☐ C. 3.7×10^0
☐ D. 3.7×10^6

4) A line passes through $(0.5, 3)$ and $(2, 9)$. What is the slope?

☐ A. 2
☐ B. 4
☐ C. 6
☐ D. $\frac{1}{4}$

5) Which scenario describes a negative slope?

☐ A. Population increases each year
☐ B. Temperature increases over time
☐ C. Your bank account grows with deposits
☐ D. Water drains from a tank over time

6) A movie theater offers two pricing schemes: Scheme A costs \$8 per ticket, Scheme B costs \$60 upfront plus \$3 per ticket. For how many tickets is Scheme A cheaper?

☐ A. Fewer than 12 tickets
☐ B. Fewer than 10 tickets
☐ C. Fewer than 15 tickets
☐ D. Fewer than 8 tickets

7) If 5 kilograms of rice cost \$15, what is the unit price (constant of proportionality) in dollars per kilogram?

8) A function f shows the distance (in miles) from home after t minutes of driving. Which describes what $f(20)$ means?

☐ A. After driving for 20 miles, you are at some time
☐ B. After 20 minutes of driving, you are 20 miles from home
☐ C. The distance from home after 20 minutes of driving
☐ D. It takes 20 minutes to drive some distance

9) Factor completely: $5x^2 + 35x + 50$.

☐ A. $5(x^2 + 7x + 10)$
☐ B. $(5x + 5)(x + 10)$
☐ C. $5(x + 2)(x + 5)$
☐ D. $5(x + 10)(x + 1)$

10) Which set of ordered pairs represents a function?

☐ A. $\{(0, 1), (0, 2), (1, 3)\}$
☐ B. $\{(2, 4), (3, 5), (4, 6)\}$
☐ C. $\{(1, 1), (1, 2), (2, 2)\}$
☐ D. $\{(5, 3), (5, 4), (6, 5)\}$

11) Plan A costs \$15 per month: $A(m) = 15 + 0.10m$. Plan B shown in table: $(0, \$20)$, $(100, \$25)$, $(200, \$30)$, $(300, \$35)$. Which plan has the higher base cost?

m	0	100	200	300
Plan B	\$20	\$25	\$30	\$35

☐ A. Plan A
☐ B. Plan B
☐ C. Both cost the same.
☐ D. Cannot be determined.

1) Angles A and B are complementary. If $A = 38°$, what is the measure of angle B?

☐ A. $52°$
☐ B. $62°$
☐ C. $142°$
☐ D. $128°$

2) Explain why 10^5 is 100 times greater than 10^3. Use exponents in your reasoning.

3) If \$3,000 earns \$450 in simple interest over 3 years, what is the annual interest rate?

☐ A. 3%
☐ B. 15%
☐ C. 10%
☐ D. 5%

4) Rewrite 6^{-3} using only positive exponents.

☐ A. $\frac{6}{3}$
☐ B. -6^3
☐ C. 6^3
☐ D. $\frac{1}{6^3}$

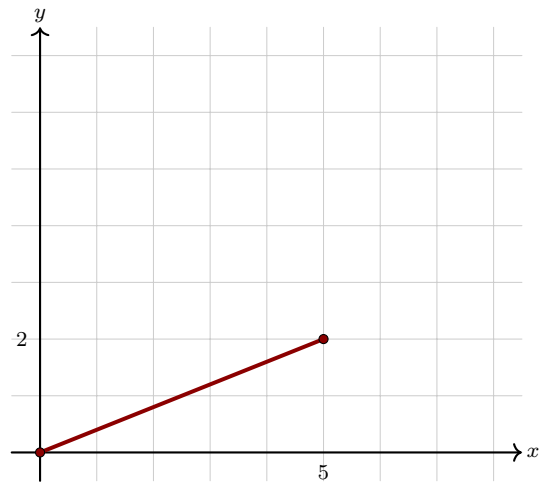
5) What is $\sqrt{361}$?

☐ A. 18
☐ B. 21
☐ C. 20
☐ D. 19

6) Which quotient is the largest?

☐ A. $\frac{8\times10^6}{4\times10^2}$
☐ B. $\frac{6\times10^5}{2\times10^1}$
☐ C. $\frac{9\times10^4}{3\times10^{-2}}$
☐ D. $\frac{4\times10^7}{2\times10^3}$

7)



Using the graph, find the equation of the proportional relationship.

☐ A. $y = 5x$
☐ B. $y = \frac{5}{2}x$
☐ C. $y = \frac{2}{5}x$
☐ D. $y = 2x$

8) Solve the system: $\begin{cases} y = x + 2 \\ y = 2x - 1 \end{cases}$

☐ A. $(3, 5)$
☐ B. $(3, 1)$
☐ C. $(5, 7)$
☐ D. $(-1, 1)$

9) A car travels at a constant speed of 60 mph. After starting, the distance d (in miles) traveled after h hours is given by which equation?

☐ A. $d = 60h$
☐ B. $d = 60h + 1$
☐ C. $d = h + 60$
☐ D. $d = \frac{60}{h}$

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.

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

1) **Choice C is correct.** 8.EE.B.5 From $(1,1)$ to $(3,4)$: slope $= \dfrac{4-1}{3-1} = \dfrac{3}{2}$.
2) **Choice D is correct.** 8.EE.A.1 When raising a power to another power, multiply exponents: $(y^4)^3 = y^{4\cdot 3} = y^{12}$.
3) **Choice C is correct.** 8.EE.A.4 Multiply: $4.2 \times (9.46 \times 10^{15}) = (4.2 \times 9.46) \times 10^{15} \approx 39.7 \times 10^{15} = 3.97 \times 10^{16}$ m.
4) **The correct answer is** 45 **.** 8.EE.C.7 Substitute $x = 1$: $(1+4)(1+8) = 5 \cdot 9 = 45$.
5) **Choice C is correct.** 8.EE.C.8c Let $t =$ the time in hours after the faster cyclist starts. The faster cyclist travels $15t$ miles, and the slower cyclist's distance from the same starting point is $9 + 12t$. Set $15t = 9 + 12t$, so $3t = 9$ and $t = 3$.
6) **Choice B is correct.** 8.F.A.1 Solve $x - 3 = 5$ for x: $x = 5 + 3 = 8$.
7) **Choice A is correct.** 8.F.A.2 Rate $= (1-3)/(1-0) = -2/1 = -2$. A quick check with the next two points gives $(-1-1)/(2-1) = -2$ again, so the rate is consistent.
8) **Choice A is correct.** 8.F.B.5 Rising = increasing distance (driving away). Flat = constant distance (stopped). Falling = decreasing distance (returning home).
9) **Choice A is correct.** 8.G.A.2 For quadrilaterals, having two equal angles is not sufficient to prove congruence. Many quadrilaterals can share two angles but have different side lengths and shapes. Congruence requires all corresponding sides and angles to be equal.
10) **Choice B is correct.** 8.G.A.3 Area scales by k^2. With $k = \frac{1}{3}$: $45 \times \left(\frac{1}{3}\right)^2 = 45 \times \frac{1}{9} = 5$.
11) **Choice A is correct.** 8.G.A.5 Corresponding angles are equal: $6y + 12 = 3y + 51$, so $3y = 39$ and $y = 13$.
12) **Choice A is correct.** 8.G.B.8 Since both points have the same x-coordinate, the distance is simply the difference in y-coordinates: $|9 - 1| = 8$.
13) **Choice A is correct.** 8.G.B.7 When angles at different intersection points both measure $62°$, they are corresponding angles, which are congruent when lines are parallel.
14) **Choice B is correct.** 8.G.C.9 Prism volume: $10 \times 8 \times 6 = 480$ cm^3. Pyramid volume: $\frac{1}{3} \times (10 \times 8) \times 3 = 80$ cm^3. Total volume is $480 + 80 = 560$ cm^3.
15) **Choice B is correct.** 8.G.B.7 Two congruent right triangles form a rectangle. Area $= 5 \times 12 = 60$ ft^2.
16) **The correct answer is** 1 **.** 8.F.A.1 A relation is a function when each input has exactly one output.
17) **Choice D is correct.** 8.G.A.5 The sum for a pentagon is $(5-2) \times 180 = 540°$. Each angle of a regular pentagon is $\frac{540}{5} = 108°$.
18) **Choice B is correct.** 8.SP.A.1 A U-shaped (parabolic) curve is nonlinear. It cannot be well-approximated by a straight line. The relationship changes direction, which is incompatible with simple linear regression assumptions.
19) **Choice C is correct.** 8.SP.A.4 Joint frequency: intersection cell (45) divided by grand total (120). This answers 'what fraction of all respondents are rural car-owners?' $= \dfrac{45}{120} \approx 0.375$.
20) **Choice A is correct.** 8.G.B.7 Each section is equal, so each has probability $\frac{1}{4}$.
21) **Choice B is correct.** 8.EE.C.7b Two location choices times three time options: $2 \times 3 = 6$ possible arrangements.
22) **The correct answer is B,D.** 8.EE.C.8a Option A is false: identical equations create the same line (infinitely many solutions). Option B is true: parallel lines never intersect. Option C is false: lines with different slopes intersect once. Option D is true: all points on the line satisfy both equations. Option E is false: perpendicularity means the lines meet at a right angle, so they still have one solution.
23) **The correct answer is** 2 **.** 8.F.A.3 Slope $= \frac{1-(-3)}{2-0} = 2$.
24) **Choice B is correct.** 8.G.B.6, 8.G.B.7 Using the Pythagorean Theorem: $5^2 + 12^2 = c^2$ gives $25 + 144 = 169$, so $c = 13$ (the 5-12-13 triple).
25) **Choice A is correct.** 8.SP.A.2 At cost \$60, the trend line is a little below the \$80 mark and clearly above \$60. The closest choice is about \$80.
26) **Choice A is correct.** 8.G.A.4 Both endpoints scale by 0.5: $(0,0) \to (0,0)$ and $(4,4) \to (2,2)$. The segment from origin to $(2,2)$ is half the original length and direction.

Author's Note

A Page for Persistence

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 5 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. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 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
- 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!

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