

10 Illinois IAR

GRADE
8
MATH

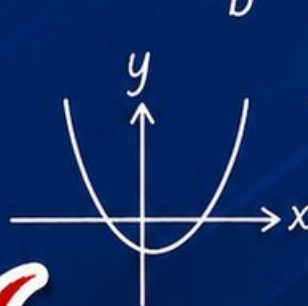
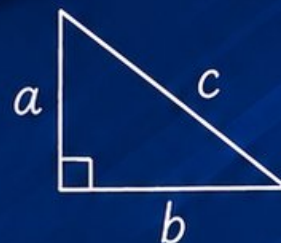
PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

10 PRINTED
TESTS 

2 ONLINE
TESTS 

- ✓ Build Confidence
- ✓ Master Key Math Skills
- ✓ Answer Explanations for Every Question
- ✓ Test-Taking Strategies That Work



$$3x - 7 = 2(x + 5)$$
$$x = 17$$



USE THESE TWO
**ADDITIONAL ONLINE
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER
THE PRINTED TESTS
IN THIS BOOK.

10 Illinois IAR Grade 8 Math Practice Tests

Illinois Grade 8 IAR Practice for city-grid clarity across proportional graphs, rate of change, algebra, geometry, and data analysis



Ten complete 40-question Grade 8 IAR practice rounds with linear relationships, scientific notation, real numbers, equations, functions, 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!

Ten focused rounds for sharper Illinois IAR math thinking

This book gives you ten full Grade 8 IAR math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

Grade 8 standards focus: This page supports **Volume of Pyramids** (8.G.C.9): Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. Another recurring target is **Slope and the Equations of a Line** (8.EE.B.6): Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line. Derive $y = mx$ and $y = \dots$

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 ten-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 a proportion, equation, diagram, number line, 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.

Grade 8 standards focus: Keep the routine connected to **Mean Absolute Deviation** (8.G.B.8): Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. The same routine helps with **Reading Function Values** (8.F.A.1): Find outputs from a function rule, table, or graph.

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?

Ten Illinois IAR tests, 400 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading.
Tests 4–6	Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.
Tests 7–9	Data analysis, probability, mixed review, stamina, and choosing efficient strategies.
Test 10	A final Illinois round to show growth across the whole book.
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.

Grade 8 standards focus: Use these habits while practicing **Rational and Irrational Numbers** (8.NS.A.1): Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats.... You will also meet **Rotations, Reflections, and Translations** (8.G.A.1): Verify experimentally the properties of rotations, reflections, and translations.



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For more practice
& answers

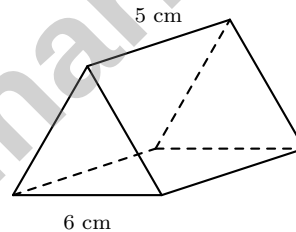
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1) A biologist records the relationship between a bacteria colony's age (days) and size (cells). The model is $S = 1500 \cdot 1.2^t$. This is NOT a linear model. Why?

- ☐ A. The growth rate (slope) is constant across all days
- ☐ B. The number of new cells added increases each day (exponential growth, not constant rate)
- ☐ C. The relationship is between days and cells, so it must be linear
- ☐ D. Exponential models always have more accuracy than linear ones

2) A credit card balance of \$750 charges 18% APR. If no payments are made, what is the interest charged after 1 year?



3)

An equilateral triangular prism has triangular bases with side length 6 cm and prism length (height) 5 cm. The height of each equilateral triangle is approximately 5.2 cm. What is the approximate total surface area?

- ☐ A. 31.2 cm^2
- ☐ B. 46.8 cm^2
- ☐ C. 121.2 cm^2
- ☐ D. 141 cm^2



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4) An athlete drinks 8 ounces of water for every 10 minutes of exercise. After 45 minutes of exercise, how many ounces has the athlete drunk?

☐ A. 30 ounces

☐ C. 40 ounces

☐ B. 45 ounces

☐ D. 36 ounces

5) Solve:
$$\begin{cases} x = 2y + 1 \\ 3x - y = 8 \end{cases}$$

☐ A. (1, 0)

☐ C. (5, 2)

☐ B. (7, 3)

☐ D. (3, 1)

6) Factor completely: $x^3 + 5x^2$.

☐ A. $x^2(x + 5)$

☐ C. $5x(x^2 + x)$

☐ B. $x(x^2 + 5x)$

☐ D. $x(x + 5)^2$

7) A recipe uses 2 cups of flour for every 3 eggs. If e is the number of eggs, which expression gives the amount of flour needed?

☐ A. $f = \frac{2e}{3}$

☐ C. $f = 3e + 2$

☐ B. $f = \frac{3e}{2}$

☐ D. $f = 2e - 3$

8) The function $y = 2 - 5x$ is linear. What are its slope and y -intercept?

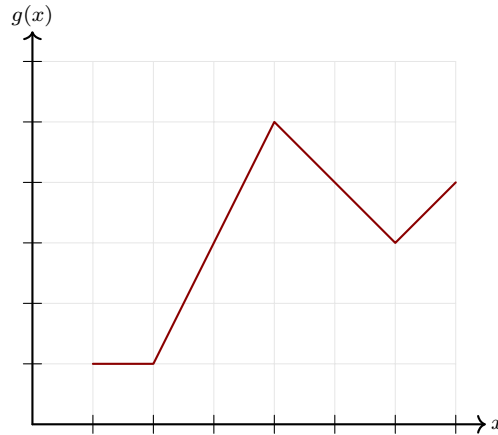
☐ A. Slope = -5 , y -intercept = -2

☐ C. Slope = -5 , y -intercept = 2

☐ B. Slope = 2 , y -intercept = -5

☐ D. Slope = 5 , y -intercept = 2





9)

State the domain of the function shown.

☐ A. $[0, 5]$
☐ C. $[1, 5]$
☐ B. $[0, 6]$
☐ D. All real numbers

- 10) Figure ABCDE is a regular pentagon (all sides equal, all angles equal). It is dilated by a scale factor of 2 to form figure A'B'C'D'E'. How does the dilated pentagon compare to the original?

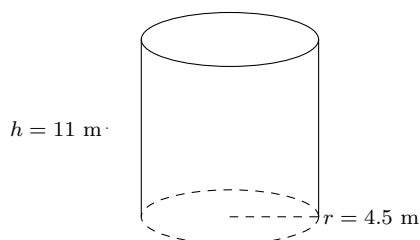
☐ A. The pentagons are congruent

☐ C. The angles are twice as large

☐ B. A'B'C'D'E' has twice the side lengths

☐ D. The pentagons are identical


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1)

A cylinder with radius 4.5 m and height 11 m is shown. Approximately, what is its volume? (Use $\pi \approx 3.14$.)

☐ A. 280.35 m^3

☐ C. 699.44 m^3

☐ B. 560.7 m^3

☐ D. 1401.56 m^3

2) Triangle A has sides 5, 12, 13. Triangle B has sides 7.5, 18, 19.5. Triangle C has sides 10, 24, 26. Which triangles are similar to Triangle A ?

☐ A. Only Triangle B

☐ C. Both Triangle B and C

☐ B. Only Triangle C

☐ D. Neither Triangle B nor C

3) If $h(x) = 3x$, what is $h(-2)$?

☐ A. -6

☐ C. -2

☐ B. 6

☐ D. 3

4) If r is a nonzero rational number and i is an irrational number, which expression is definitely rational?

☐ A. $r + i$

☐ C. $\frac{r}{i}$ (where $r \neq 0$)

☐ B. $r \times i$

☐ D. $i - r$



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5) Which scenario would produce a scatter plot with NO correlation?

- ☐ A. Number of hours practiced versus sports performance ☐ C. Temperature outside versus heating costs
☐ B. Shoe size versus favorite color ☐ D. Years of education versus average salary

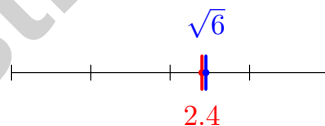
6) Convert $0.\overline{45}$ to a fraction in simplest form.

- ☐ A. $\frac{9}{20}$ ☐ C. $\frac{45}{90} = \frac{1}{2}$
☐ B. $\frac{45}{100}$ ☐ D. $\frac{45}{99} = \frac{5}{11}$

7) The elevation rises 500 feet over a horizontal distance of 2000 feet. What is the slope?

Perfect Squares: $2^2 = 4$, $3^2 = 9$

Compare to $\sqrt{6}$ and 2.4



8)

Is $\sqrt{6}$ greater than 2.4 or less than 2.4?

- ☐ A. Cannot compare ☐ C. Equal to
☐ B. Less than ☐ D. Greater than



1) Which two points give a slope of $-\frac{3}{2}$?

☐ A. (0, 3) and (2, 0)

☐ C. (2, 4) and (4, 4)

☐ B. (1, 2) and (3, 4)

☐ D. (0, 0) and (3, 2)

2) If a linear function has a constant rate of change of 3, and passes through (0, 5), write the equation in the form $y = mx + b$.

3) Simplify $\frac{m^8}{m^5} \cdot m^2$.

☐ A. m^{15}

☐ C. m^{13}

☐ B. m^1

☐ D. m^5

4) The area of a rectangular field is $(7 \times 10^3) \text{ m} \times (4 \times 10^2) \text{ m}$. What is the area in square meters, in scientific notation?

☐ A. 28×10^4

☐ C. 2.8×10^6

☐ B. 11×10^5

☐ D. 2.8×10^7

5) A parking meter charges \$2.50 initial fee plus \$0.75 per hour. What is the hourly rate?



- 6) Tickets cost \$4 for children and \$7 for adults. The theater sold 200 tickets for a total of \$1,100. How many children's tickets were sold?
- ☐ A. 100 ☐ C. 50
☐ B. 150 ☐ D. 120
- 7) Plant X : $H(d) = 2d + 10$ cm. Plant Y at days 0, 5, 10 has heights 15, 20, 25 cm. Which started taller?
- ☐ A. Plant X ☐ C. Both same.
☐ B. Plant Y ☐ D. Cannot be determined.
- 8) Triangle PQR has sides of length 5 cm, 12 cm, and 13 cm. Triangle STU is congruent to triangle PQR. If side ST corresponds to side PQ , what is the length of side ST ?
- ☐ A. 5 cm ☐ C. 13 cm
☐ B. 12 cm ☐ D. 30 cm



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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 B is correct.** **(8.SP.A.3)** In a linear model (8.SP.3), the rate of change is constant—the same number of cells are added each day. Here, the exponent t makes the rate accelerate: day 1 might add 300 cells, day 2 adds 360 cells, etc. This violates the constant-slope assumption of linear models.
- 2) **The correct answer is \$135.** **(8.G.B.7)** $I = 750 \times 0.18 \times 1 = \135 .
- 3) **Choice C is correct.** **(8.G.C.9)** Two triangular bases: $2 \times \frac{1}{2}(6)(5.2) = 31.2 \text{ cm}^2$. Three rectangular sides: $3 \times (6 \times 5) = 90 \text{ cm}^2$. Total $\approx 31.2 + 90 = 121.2 \text{ cm}^2$.
- 4) **Choice D is correct.** **(8.EE.B.5)** Unit rate: $\frac{8}{10} = 0.8 \text{ oz per minute}$. After 45 minutes: $0.8 \times 45 = 36 \text{ ounces}$.
- 5) **Choice D is correct.** **(8.EE.C.8a)** Substitute $x = 2y + 1$ into $3x - y = 8$: $3(2y + 1) - y = 8$, so $6y + 3 - y = 8$, giving $5y = 5$ and $y = 1$. Then $x = 2(1) + 1 = 3$. Solution: $(3, 1)$.
- 6) **Choice A is correct.** **(8.EE.C.7)** GCF is x^2 : $x^3 + 5x^2 = x^2(x + 5)$.
- 7) **Choice A is correct.** **(8.F.A.1)** The ratio is 2 cups flour : 3 eggs. For e eggs, flour needed is $\frac{2}{3} \times e = \frac{2e}{3}$.
- 8) **Choice C is correct.** **(8.F.A.3)** Rewrite as $y = -5x + 2$. In the form $y = mx + b$, the slope $m = -5$ and the y -intercept $b = 2$.
- 9) **Choice B is correct.** **(8.F.B.5)** The graph is defined from $x = 0$ to $x = 6$, so the domain is $[0, 6]$. The range would be $[1, 5]$, but the question asks for domain.
- 10) **Choice B is correct.** **(8.G.A.2)** Dilation by scale factor 2 enlarges all side lengths by a factor of 2, but angles remain unchanged. The dilated pentagon is SIMILAR to the original, not congruent (unless the scale factor is 1).
- 11) **Choice C is correct.** **(8.G.A.3)** Under 180° rotation, $(x, y) \rightarrow (-x, -y)$: $(1, 1) \rightarrow (-1, -1)$, $(3, 1) \rightarrow (-3, -1)$, $(2, 3) \rightarrow (-2, -3)$. This matches the red triangle.
- 12) **The correct answer is 8.** **(8.EE.A.2)** $e^3 = 512$, so $e = \sqrt[3]{512} = 8 \text{ feet}$.
- 13) **Choice C is correct.** **(8.G.A.5)** In an isosceles triangle, the two base angles are equal. If the vertex angle is 40° , then $40 + 2x = 180$, so $x = 70^\circ$.
- 14) **Choice B is correct.** **(8.G.B.8)** Distance $= \sqrt{12^2 + 5^2} = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ nm}$. (This is a 5-12-13 Pythagorean triple.)
- 15) **Choice B is correct.** **(8.G.C.9)** Radius $r = 5 \text{ cm}$. $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 125 = 523.33 \text{ cm}^3$.
- 16) **Choice B is correct.** **(8.G.B.7)** Vertical angles are congruent. Adjacent angles are supplementary: $180 - 72 = 108^\circ$. The four angles are $72^\circ, 108^\circ, 72^\circ, 108^\circ$.
- 17) **Choice C is correct.** **(8.G.C.9)** Pyramid: $V_{py} = \frac{1}{3} \times 36 \times 6 = 72 \text{ cm}^3$. Cube: $V_c = 6^3 = 216 \text{ cm}^3$. Ratio: $\frac{72}{216} = 1 : 3$.
- 18) **Choice A is correct.** **(8.G.B.7)** Decompose using subtraction: circle minus rectangle. Circle area $= \pi r^2 = 3.14 \times 4^2 = 50.24 \text{ m}^2$. Rectangle area $= 8 \times 3 = 24 \text{ m}^2$. Remaining $= 50.24 - 24 = 26.24 \text{ m}^2$.
- 19) **Choice C is correct.** **(8.SP.A.4)** Both age groups show the same row-conditional frequency for books ($\frac{140}{210} \approx 0.67$). Identical conditional frequencies across groups indicate no association. Option D confuses marginal with association.
- 20) **The correct answer is A,D.** **(8.G.B.8)** A is correct: P's smaller MAD (3 vs 7) means values cluster more tightly around the mean. D is correct: we are told both have 10 values. B is incorrect: P has less variability. C is not guaranteed by MAD alone, and E is incorrect because both means are equal at 50.
- 21) **Choice D is correct.** **(8.EE.A.1)** After $3^2 = 9$ hours, doubling 9 times means multiply by 2^9 . Total: $10^2 \cdot 2^9$.
- 22) **Choice C is correct.** **(8.EE.A.4)** Same exponents: $(6.5 - 3.2) \times 10^5 = 3.3 \times 10^5$.
- 23) **Choice B is correct.** **(8.F.A.2)** $f(10) = 20 + 1.5(10) = 35$. $g(10) = 25 + 2(10) = 45$. Since $45 > 35$, g is larger at $t = 10$.
- 24) **Choice A is correct.** **(8.F.B.4)** Slope: $m = \frac{18-9}{5-2} = \frac{9}{3} = 3$. Using point $(2, 9)$: $9 = 3(2) + b \Rightarrow b = 3$. So $y = 3x + 3$.
- 25) **Choice B is correct.** **(8.G.B.6, 8.G.B.7)** Verify: $121 + 3600 = 3721 = 61^2$. This is the 11-60-61 Pythagorean triple.
- 26) **Choice A is correct.** **(8.G.A.5)** The sum of interior angles is $(n - 2) \times 180$. For a regular polygon, divide by n sides to get each angle.
- 27) **Choice C is correct.** **(8.SP.A.1)** Shoe size is determined by body size, while favorite color is a personal preference unrelated to shoe size. There is no logical connection.



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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 10 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!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



THIS BOOK INCLUDES:

10 Full-Length Printed Tests

2 Online Practice Tests

 Detailed Answers & Explanations



MORE PRACTICE. GREATER RESULTS.

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

WHAT YOU'LL GAIN



Build Confidence

Practice regularly to feel prepared and test-ready.



Master Key Skills

Develop strong math skills and problem solving abilities.



Improve Understanding

Learn with clear explanations and step-by-step solutions.



Test Strategies

Learn proven strategies to approach every question with confidence.



Boost Performance

Apply your knowledge and achieve your best score!

TOPICS COVERED

- | | |
|---------------------------|----------------------------|
| ✓ The Number System | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Data Analysis |
| ✓ Inequalities | ✓ Measurement |
| ✓ Functions | ✓ Pythagorean Theorem |
| ✓ Geometry | ✓ Surface Area & Volume |
| ✓ Ratios & Proportions | ✓ And More! |



2 ONLINE TESTS

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



2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE
REGULARLY



STAY
FOCUSED



SOLVE
CONFIDENTLY



SUCCEED
BRIGHTLY