

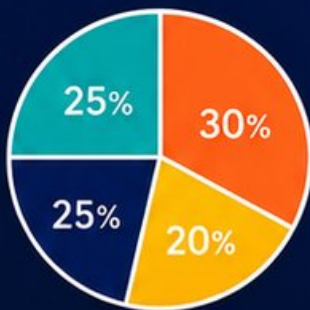
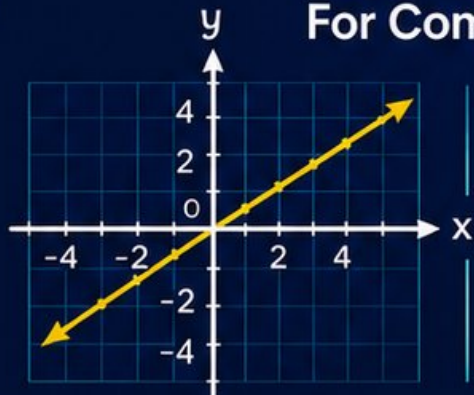
Illinois IAR

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

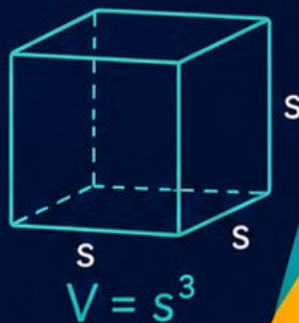


$$y = mx + b$$

$$2x - 3y = 6$$

$$\sqrt{x^2 + y^2}$$

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS



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



4 Illinois IAR Grade 8 Math Practice Tests

Grade 8 IAR Practice for Equations, Graphs, Geometry, and Data



Four 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!

Four focused rounds for sharper IAR math thinking

This book gives you four 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 four-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?

Four IAR tests, 160 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–4	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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& answers

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1) What is $(5 \times 10^7) \times (4 \times 10^3)$?

☐ A. 2×10^{10}

☐ C. 9×10^{10}

☐ B. 20×10^4

☐ D. 2×10^{11}

2) Three points lie on the same line: $(1, 5)$, $(3, 9)$, and $(x, 13)$. What is the value of x ?

☐ A. 4

☐ C. 6

☐ B. 7

☐ D. 5

3) A water tank contains saltwater at 2% concentration. To reduce the concentration to 1%, how much pure water must be added to 100 liters of the 2% solution?

☐ A. 50 L

☐ C. 100 L

☐ B. 75 L

☐ D. 150 L

4) A data point is at $(3, 8)$ and the trend line at $x = 3$ predicts $y = 6$. What is the residual?

5) Distance traveled: Function $d_1(t) = 55t$ miles (constant speed). Function d_2 at hours $(0, 0)$, $(3, 180)$. After 6 hours, which distance greater?

☐ A. d_1

☐ C. Same distance

☐ B. d_2

☐ D. Cannot determine



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- 6) A right triangle has legs of 7 and 24. What is the hypotenuse?
- ☐ A. 17 ☐ C. 25
☐ B. 20 ☐ D. 31
- 7) A quadrilateral has interior angles 72° , 88° , 95° , and x . What is x ?
- ☐ A. 100° ☐ C. 110°
☐ B. 105° ☐ D. 115°
- 8) Triangle X is similar to Triangle Y . In Triangle X , one angle measures 60° . What is the measure of the corresponding angle in Triangle Y ?
- ☐ A. 30° ☐ C. 120°
☐ B. 60° ☐ D. Cannot be determined
- 9) If $f(x) = -3x + 10$, what is $f(2)$?
- ☐ A. 4 ☐ C. -6
☐ B. 16 ☐ D. 6
- 10) Which of the following is rational?
- ☐ A. π ☐ C. $0.101001000\dots$ (non-repeating)
☐ B. $\sqrt{15}$ ☐ D. $\sqrt{36}$
- 11) What is $0.\overline{32}$ as a fraction?
- ☐ A. $\frac{3}{20}$ ☐ C. $\frac{32}{99}$
☐ B. $\frac{32}{100}$ ☐ D. $\frac{29}{90}$



12) To the nearest tenth, which is the best estimate for $\sqrt{56}$?

☐ A. 7.0

☐ C. 8.0

☐ B. 6.0

☐ D. 7.5

13) Two fair coins are flipped. What is the probability of getting exactly one heads?
Write your answer as a fraction.

14) How many different ways can a teacher select a line leader and a helper from a group of 12 students? (Assume these are two different positions.)

15) Which statement is FALSE?

☐ A. $\pi \approx 3.14$

☐ C. $\sqrt{50} \approx 5.0$

☐ B. $\sqrt{2} \approx 1.4$

☐ D. $\sqrt{15} \approx 3.9$

16) What is 0.00056 in scientific notation?

☐ A. 56×10^{-5}

☐ C. 5.6×10^4

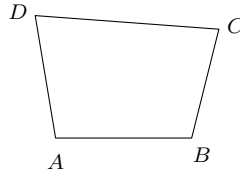
☐ B. 5.6×10^{-5}

☐ D. 5.6×10^{-4}



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1)

A quadrilateral has angles $A = 85^\circ$, $B = 95^\circ$, $C = 100^\circ$. What is angle D ?

☐ A. 70° ☐ C. 90° ☐ B. 80° ☐ D. 100°

2) A store's revenue is $\$200 + \15 per item sold. What is the slope of revenue versus items sold?

☐ A. $\$200$ ☐ C. $\$215$ ☐ B. $\$30$ ☐ D. $\$15$

3) A piggy bank holds 25 coins consisting of nickels (5¢) and dimes (10¢). The total value is $\$1.70$. How many nickels are in the bank?

☐ A. 10☐ C. 12☐ B. 16☐ D. 8

4) A card is drawn from a standard deck. What is the probability that it is either a 5 or a 9?

☐ A. $\frac{5}{52}$ ☐ C. $\frac{4}{52}$ ☐ B. $\frac{8}{52}$ ☐ D. $\frac{9}{52}$ 

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- 5) A game involves picking a number (1, 2, or 3) and a letter (A or B). The table lists some outcomes. How many total outcomes should the complete table show?

Number	A	B
1	(1,A)	(1,B)
2	(2,A)	(2,B)
3	(3,A)	(3,B)

- ☐ A. $3 + 2 = 5$
☐ C. $2^3 = 8$
☐ B. $3 \times 2 = 6$
☐ D. $3^2 = 9$
- 6) Function $p(x) = \frac{3}{2}x - 4$ and the table for function q : (0, 2), (2, 5), (4, 8). Which has a steeper slope?

x	0	2	4
$q(x)$	2	5	8

- ☐ A. $p(x)$
☐ C. Both have equal slopes.
☐ B. $q(x)$
☐ D. Cannot be determined.
- 7) Simplify $\frac{x^{10} \cdot x^{-3}}{x^4}$. What is the exponent on x in the final answer?

- 8) A rectangular garden is 8 meters long and 6 meters wide. What is the distance from one corner to the opposite corner (diagonal)?
- ☐ A. 10 m
 ☐ C. 14 m
☐ B. 7 m
 ☐ D. 48 m



1) Company A: $A(d) = 40 + 0.15d$. Company B through $(100, 55)$ and $(200, 80)$. Which has higher rate?

☐ A. Company A

☐ C. Both same.

☐ B. Company B

☐ D. Cannot be determined.

2) Simplify $\frac{a^4b^3}{a^2b}$.

☐ A. a^2b^{-2}

☐ C. a^6b^4

☐ B. a^2b^3

☐ D. $\frac{a^2b^2}{1}$ or a^2b^2

3) $\frac{8 \times 10^{-3}}{2 \times 10^{-7}} = ?$

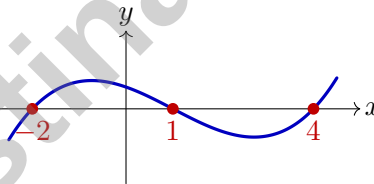
☐ A. 6×10^4

☐ C. 4×10^4

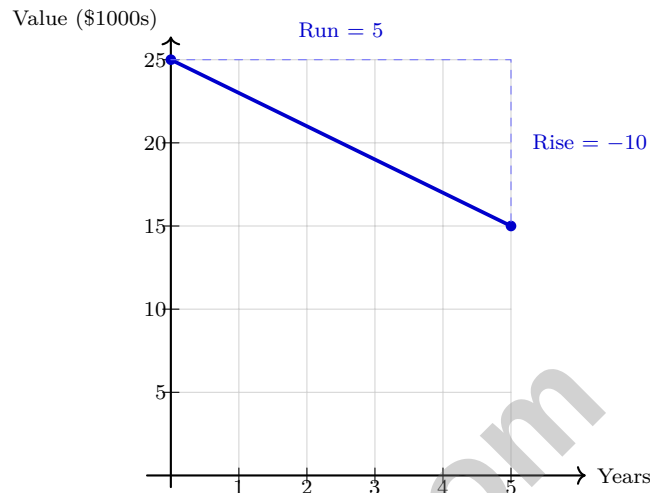
☐ B. 4×10^{-10}

☐ D. 10×10^4

4) A graph of a function crosses the x -axis at $x = -2$, $x = 1$, and $x = 4$. How many sign intervals do these intercepts create?



- 5) A graph shows the value of a car (in \$1000s) depreciating over years. The line passes through $(0, 25)$ and $(5, 15)$.



- ☐ A. -\$2000 per year ☐ C. \$2000 per year
☐ B. -\$1000 per year ☐ D. 5 years per \$1000
- 6) A water tank holds 200 gallons at 15% salinity. To reduce salinity to 10%, how much fresh water (0% salinity) should be added?
- ☐ A. 50 gal ☐ C. 100 gal
☐ B. 150 gal ☐ D. 200 gal
- 7) If $h(x) = -x + 4$, what is $h(1)$?
- ☐ A. 3 ☐ C. -3
☐ B. 5 ☐ D. 4



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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 D is correct.** (8.EE.A.4) Multiply coefficients: $5 \times 4 = 20$. Add exponents: $10^{7+3} = 10^{10}$. Rewrite $20 \times 10^{10} = 2 \times 10^{11}$.
- 2) **Choice D is correct.** (8.EE.B.5) Slope from (1, 5) to (3, 9) is $\frac{9-5}{3-1} = 2$. From (3, 9) to (x, 13): $2 = \frac{13-9}{x-3}$, so $2 = \frac{4}{x-3}$, giving $x = 5$.
- 3) **Choice C is correct.** (8.EE.C.8c) Initial salt amount: $0.02(100) = 2$ L. After adding x liters of pure water, total volume is $100 + x$ and salt amount is still 2 L. Setting concentration to 1%: $\frac{2}{100+x} = 0.01$, so $2 = 0.01(100 + x) = 1 + 0.01x$, giving $0.01x = 1$, thus $x = 100$ L.
- 4) **The correct answer is 2.** (8.SP.A.2) Residual = actual - predicted = $8 - 6 = 2$.
- 5) **Choice B is correct.** (8.F.A.2) $d_1(6) = 55(6) = 330$ miles. Slope of d_2 : $180/3 = 60$ mph, so $d_2(6) = 0 + 60(6) = 360$ miles. Since $360 > 330$, d_2 is greater.
- 6) **Choice C is correct.** (8.G.B.6, 8.G.B.7) Using the Pythagorean Theorem: $7^2 + 24^2 = 49 + 576 = 625$, so $c = 25$ (the 7-24-25 triple).
- 7) **Choice B is correct.** (8.G.A.5) Sum of interior angles in a quadrilateral is 360° . So $x = 360 - 72 - 88 - 95 = 105^\circ$.
- 8) **Choice B is correct.** (8.G.A.4) In similar figures, corresponding angles are congruent. The angle measure does not change with dilation.
- 9) **Choice A is correct.** (8.F.A.1) Substitute $x = 2$: $f(2) = -3(2) + 10 = -6 + 10 = 4$.
- 10) **Choice D is correct.** (8.NS.A.1) $\sqrt{36} = 6$, which is an integer and therefore rational. The others are irrational: π is transcendental, $\sqrt{15}$ is a square root of a non-perfect square, and $0.101001000\dots$ is non-terminating and non-repeating.
- 11) **Choice D is correct.** (8.NS.A.1) Let $x = 0.3\overline{2} = 0.3222\dots$. Then $10x = 3.\overline{2}$ and $100x = 32.\overline{2}$. Subtracting: $90x = 29$, so $x = \frac{29}{90}$.
- 12) **Choice D is correct.** (8.NS.A.2) $7^2 = 49$ and $8^2 = 64$. Since 56 is near the midpoint between 49 and 64, $\sqrt{56} \approx 7.48$, closest to 7.5.
- 13) **The correct answer is $\frac{1}{2}$.** (8.G.B.7) Sample space: HH, HT, TH, TT. Exactly one heads: HT, TH. That's 2 of 4. $P = \frac{1}{2}$.
- 14) **The correct answer is 132.** (8.EE.C.7b) Line leader: 12 choices. Helper: 11 remaining choices. Total: $12 \times 11 = 132$ ways.
- 15) **Choice C is correct.** (8.NS.A.2) $\sqrt{50} = 5\sqrt{2} \approx 5 \times 1.41 = 7.07$, not 5.0. All other statements are accurate estimates.
- 16) **Choice D is correct.** (8.EE.A.3) Move the decimal 4 places right to get 5.6; since the original is less than 1, the exponent is -4 .
- 17) **Choice B is correct.** (8.G.C.9) Base area = $6^2 = 36 \text{ cm}^2$. Lateral area = $96 - 36 = 60 \text{ cm}^2$. Lateral = $4 \times \frac{1}{2}(6)(\ell) = 12\ell = 60$, so $\ell = 5 \text{ cm}$.
- 18) **Choice B is correct.** (8.G.A.1) Reflection across the x -axis uses $(x, y) \rightarrow (x, -y)$. The point (3, 1) reflects to (3, -1).
- 19) **Choice D is correct.** (8.EE.B.6) A line through the origin has y -intercept 0. With slope 3, the equation is $y = 3x + 0$ or $y = 3x$.
- 20) **The correct answer is C,E.** (8.EE.A.1) (A) False: $x^0 = 1$ for $x \neq 0$, not 0. (B) False: negative exponent creates a reciprocal, not a negative base (e.g., $2^{-1} = \frac{1}{2} > 0$). (C) True: $(x^2)^3 = x^{2 \cdot 3} = x^6$ ✓. (D) False: $x^{-2} = \frac{1}{x^2}$, not $-x^2$ (e.g., $2^{-2} = \frac{1}{4} \neq -4$). (E) True: quotient rule ✓.
- 21) **Choice D is correct.** (8.EE.C.7) Distribute: $-2n + 8 = 10$. Subtract 8: $-2n = 2$. Divide by -2 : $n = -1$.
- 22) **Choice D is correct.** (8.EE.C.8b) Subtract 3: $-2x > -8$. Divide by -2 (FLIP): $x < 4$. Open circle and left ray.
- 23) **Choice B is correct.** (8.EE.C.8b) DASHED line means $>$ or $<$. Shading BELOW means $y <$. Combined: $y < -x + 2$.
- 24) **Choice B is correct.** (8.G.C.9) $V_{\text{cone}} = \frac{1}{3}V_{\text{cyl}} = \frac{1}{3} \times 900 = 300 \text{ cm}^3$. Difference: $900 - 300 = 600 \text{ cm}^3$. ✓
- 25) **Choice C is correct.** (8.SP.A.3) Substitute $x = 6$: $R = 20 + 3(6) = 20 + 18 = \38 .



Hi, Future Algebra Thinker!

◇ Grade 8 practice builds a bridge to high school mathematics through exponents, linear systems, functions, transformations, geometry, and data models. This carefully paced book gave you four steady Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** Every time you solved for an unknown or explained a relationship, you were building skills that future math will use again. ★

Bridge Skills

- **Use Variables:** Let letters stand for unknown values.
- **Balance Equations:** Keep both sides fair.
- **Read Graphs:** Connect points to meaning.
- **Compare Rates:** Look for constant relationships.

Grade 8 test-day tip: When you see a variable, say what it represents. That keeps algebra connected to the problem.

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

Jay Daie

Your Algebra Bridge Coach

PRACTICE TODAY, ACHIEVE TOMORROW!

Give your child the confidence and skills they need with **4 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!

4



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!



4 PRINTED TESTS



2 ONLINE TESTS



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