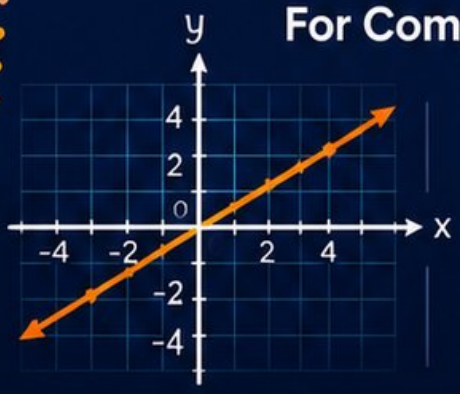
8 Illinois IAR GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$A = \pi r^2$
$C = 2\pi r$
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3} b^2 h$

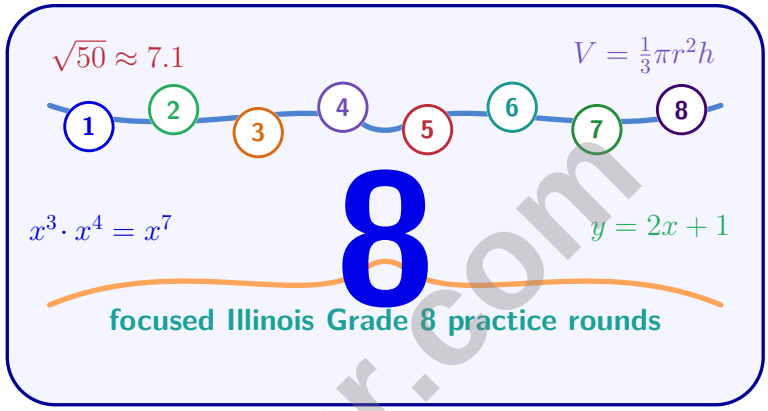
8 PRINTED TESTS

2 ONLINE TESTS

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

8 Illinois IAR Grade 8 Math Practice Tests

Illinois Practice for Functions, Geometry, Linear Models, and Data



Eight 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!

Eight focused rounds for sharper IAR math thinking

This book gives you eight 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

An eight-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?

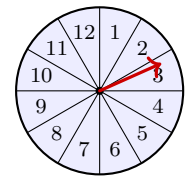
Eight IAR tests, 320 questions, and a complete review path

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 7–8	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.

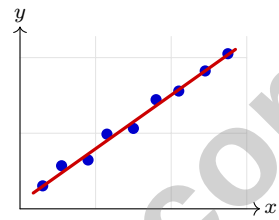
Table of Contents

1) A spinner has 12 equal sections. What is the probability of NOT landing on section 7?



☐ A. $\frac{5}{12}$
☐ B. $\frac{7}{12}$
☐ C. $\frac{1}{12}$
☐ D. $\frac{11}{12}$

2)



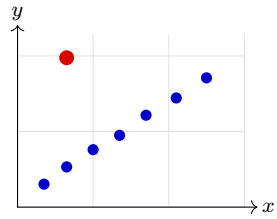
A scatter plot shows the relationship between study time (hours) and quiz performance (percent). Which phrase best completes: "The strength of a linear model depends on..."?

☐ A. How close data points cluster to the trend line
☐ B. Whether the line has a positive slope
☐ C. The total number of data points
☐ D. The starting value of the y-intercept

3) A student incorrectly states: "In a right triangle, if the hypotenuse is 13 and one leg is 5, the other leg must be $13 - 5 = 8$." What is the correct other leg?

☐ A. 8 (student's answer; incorrect)
☐ B. 12 (correct)
☐ C. 18
☐ D. 9

4)



A scatter plot shows years of education versus annual income for 100 adults. Most points cluster in an upward trend, but three points are far below the trend line, representing people with high education but low income. These three points are:

☐ A. Errors that should be removed
☐ B. Part of the overall trend
☐ C. Examples of no correlation
☐ D. Outliers deserving investigation

5) In a survey of 80 coffee drinkers, 50 add cream and 30 do not. Of those who add cream, 35 are office workers. What is the relative frequency of office workers among cream-adders, rounded to the nearest whole percent?

☐ A. 44%
☐ B. 70%
☐ C. 62%
☐ D. 56%

6) Two classes have the same mean test score of 75. Class A has MAD = 3, and Class B has MAD = 8. What does this tell us?

☐ A. Class B has higher individual scores
☐ B. Class A has more students
☐ C. Class A has more consistent scores
☐ D. Class B performed better overall

7) Which expression equals a rational number?

☐ A. $\sqrt{2} \times \sqrt{3}$
☐ B. $\sqrt{4} + \sqrt{5}$
☐ C. $\sqrt{3} + \sqrt{3}$
☐ D. $\sqrt{9} \times \sqrt{4}$

8) Trapezoid MNOP has parallel sides of 8 cm and 14 cm. If trapezoid MNOP is congruent to trapezoid QRST, and side $QR = 8$ cm, find the length of the side that corresponds to the 14 cm side of MNOP.

9) A rectangular pyramid has a base 8 m by 5 m and a volume of 240 m^3. What is its height?

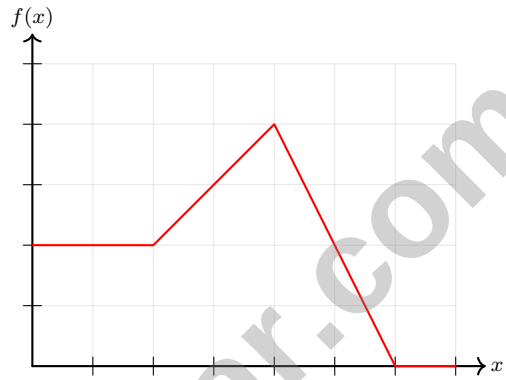
10) What is $0.1\overline{2}$ as a fraction?

☐ A. $\frac{12}{100}$
☐ B. $\frac{1}{12}$
☐ C. $\frac{12}{99}$
☐ D. $\frac{11}{90}$

11) A path forms a rectangular frame: outer 25 m by 15 m, inner 20 m by 10 m. What is the area of the path only, in m^2?

1) A borrower needs to repay $1,000. She has time but limited monthly cash flow. Comparing the plans, which choice represents the BEST overall financial decision (lowest total cost + manageable payments)?

☐ A. $50/month for 24 months (total $1,200; low monthly cost)
☐ B. $100/month for 12 months (total $1,200; medium monthly cost)
☐ C. $125/month for 8 months (total $1,000; high monthly cost)
☐ D. $83/month for 18 months (total $1,494; expensive overall)

2) 

Identify the intervals where the function is increasing.

☐ A. From $x = 1$ to $x = 3$ only
☐ B. From $x = -1$ to $x = 1$
☐ C. From $x = 1$ to $x = 3$ and from $x = 3$ to $x = 5$
☐ D. From $x = -1$ to $x = 3$

3) A triangle is reflected across a horizontal line, then rotated 180 degrees. If the original triangle has an area of 35 square cm, what is the area of the final triangle?

☐ A. 17.5 sq cm
☐ B. 35 sq cm
☐ C. 70 sq cm
☐ D. Cannot be determined

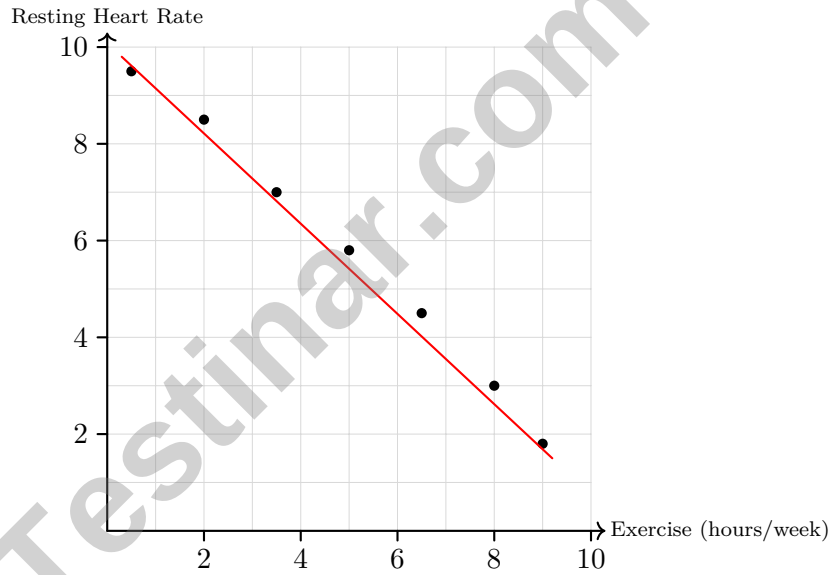
4) A box contains 6 pencils: 2 red, 3 blue, and 1 green. If you draw a pencil, replace it, then draw again, what is the probability of drawing blue both times?

☐ A. $\frac{9}{36}$
☐ B. $\frac{1}{3}$
☐ C. $\frac{3}{18}$
☐ D. $\frac{3}{6}$

5) Point $D(4, 5)$ undergoes a dilation centered at the origin with scale factor 2. What is the distance from the origin to the dilated point D'?

☐ A. $\sqrt{41}$
☐ B. $2\sqrt{41}$
☐ C. 18
☐ D. 9

6)



The scatter plot shows a strong negative relationship between exercise and resting heart rate. Which statement is most accurate?

☐ A. Lower heart rates prevent people from exercising
☐ B. Exercise has no effect on heart rate
☐ C. People with higher heart rates exercise less on average
☐ D. More exercise causes lower heart rates

1) Which fraction equals $0.\overline{12}$?

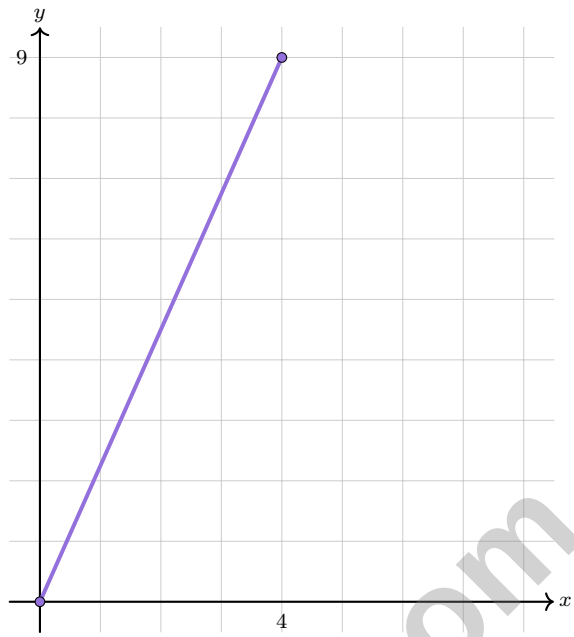
☐ A. $\frac{12}{100}$
☐ B. $\frac{1}{12}$
☐ C. $\frac{12}{90}$
☐ D. $\frac{12}{99} = \frac{4}{33}$

2) A bank account earns 3% simple interest on a principal of \$2,000. How much interest will be earned in 4 years?

3) A parallelogram has a base of 8 inches and a slant side of 6 inches. After a reflection, what are the dimensions of the reflected parallelogram?

☐ A. 4 inches and 3 inches
☐ B. 8 inches and 6 inches
☐ C. 12 inches and 9 inches
☐ D. 16 inches and 12 inches

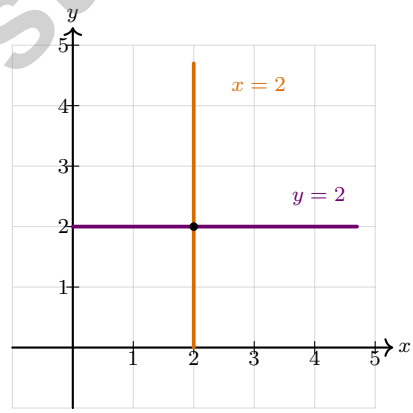
4)



The ratio $y : x$ is:

☐ A. $4 : 9$
☐ B. $0.44 : 1$
☐ C. $1 : 2.25$
☐ D. $9 : 4$

5) Graph the two equations and identify what type of solution the system has.



☐ A. No solution
☐ B. Infinitely many solutions
☐ C. Exactly one solution at $(2, 2)$
☐ D. Two solutions

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 D is correct.** 8.G.B.7 $P(\text{not } 7) = 1 - P(7) = 1 - \frac{1}{12} = \frac{11}{12}$.
2) **Choice A is correct.** 8.SP.A.2 A strong linear model has points tightly clustered around the line, reflected in small residuals.
3) **Choice B is correct.** 8.G.B.6, 8.G.B.7 The correct calculation uses the Pythagorean Theorem: $5^2 + b^2 = 13^2$ gives $25 + b^2 = 169$, so $b = 12$. The student's error was subtracting instead of using $a^2 + b^2 = c^2$.
4) **Choice D is correct.** 8.SP.A.1 These points deviate significantly from the trend and warrant investigation (e.g., career changes, health issues, recent graduates).
5) **Choice B is correct.** 8.SP.A.4 This is a row-conditional relative frequency. Among cream-adders (50 total), 35 are office workers: $\frac{35}{50} = 0.70 = 70\%$.
6) **Choice C is correct.** 8.G.B.8 A smaller MAD (Class A = 3) indicates less variability and more consistency. Class B's larger MAD (8) shows greater spread in scores.
7) **Choice D is correct.** 8.NS.A.1 $\sqrt{9} \times \sqrt{4} = 3 \times 2 = 6$, which is rational. The other expressions yield irrationals: $\sqrt{3} + \sqrt{3} = 2\sqrt{3}$, $\sqrt{4} + \sqrt{5} = 2 + \sqrt{5}$, and $\sqrt{2} \times \sqrt{3} = \sqrt{6}$.
8) **The correct answer is** 14 **.** 8.G.A.2 Since the trapezoids are congruent and $QR = 8$ cm corresponds to one of the parallel sides of MNOP, the other parallel side of QRST must also be 14 cm.
9) **The correct answer is** 18 **.** 8.G.C.9 $B = 8 \times 5 = 40$ m^2. From $V = \frac{1}{3}Bh$: $240 = \frac{1}{3} \times 40 \times h \Rightarrow h = 18$ m.
10) **Choice D is correct.** 8.NS.A.1 Let $x = 0.1\overline{2} = 0.1222\ldots$. Then $10x = 1.\overline{2}$ and $100x = 12.\overline{2}$. Subtracting: $90x = 11$, so $x = \frac{11}{90}$.
11) **The correct answer is** 175 **.** 8.G.B.7 Outer $= 25 \times 15 = 375$ m^2. Inner $= 20 \times 10 = 200$ m^2. Path $= 375 - 200 = 175$ m^2.
12) **Choice D is correct.** 8.NS.A.2 $7^2 = 49$ and $8^2 = 64$. Since $49 < 53 < 64$, we have $7 < \sqrt{53} < 8$.
13) **Choice B is correct.** 8.EE.C.7b Two morning choices times three afternoon choices: $2 \times 3 = 6$ possible schedules.
14) **Choice A is correct.** 8.EE.C.7 Distribute: $6x + 12 = 30$. Subtract 12: $6x = 18$. Divide by 6: $x = 3$.
15) **Choice D is correct.** 8.EE.A.2 $5 \times 5 \times 5 = 125$, so $\sqrt[3]{125} = 5$.
16) **Choice D is correct.** 8.EE.A.3 Move the decimal 6 places left: $5.3 \times 10^{-6} = 0.0000053$ mm.
17) **Choice C is correct.** 8.EE.B.5 Store A: $8/4 = 2$ per notebook. Store B: $12/5 = 2.40$ per notebook. Store A is cheaper.
18) **The correct answer is A,D.** 8.G.A.3 Reflection across the x-axis maps (x, y) to $(x, -y)$, so $(0, 1) \to (0, -1)$ and $(2, 3) \to (2, -3)$. A dilation by scale factor 1 does not change the figure, so option D also results in the same reflection. Reflection across $y = 1$ would not map the whole rectangle to the purple image.
19) **Choice C is correct.** 8.EE.B.6 Rewrite in slope-intercept form: $2y = -x + 8$, so $y = -\frac{1}{2}x + 4$. The slope is $-\frac{1}{2}$.
20) **Choice A is correct.** 8.EE.C.8a When two distinct lines do not intersect (parallel lines), they have no points in common, so the system has no solution.
21) **Choice C is correct.** 8.EE.C.8b Solving $2x - 3 < 5$ gives $2x < 8$, so $x < 4$. Of the listed choices, only $x = 3$ satisfies the inequality.
22) **Choice B is correct.** 8.EE.C.7 Factor out GCF of 9: $9(x^2 - 4)$. Then difference of squares: $9(x - 2)(x + 2)$.
23) **Choice B is correct.** 8.G.A.5 The exterior angle at B is supplementary to the interior angle B: exterior angle $= 180 - 70 = 110°$. Alternatively, exterior angle $= \angle A + \angle C = 55 + 55 = 110°$.
24) **Choice D is correct.** 8.NS.A.2 Using $\pi \approx 3.14$ and $\sqrt{10} \approx 3.16$ (since $3.16^2 \approx 9.99$), the sum is approximately 6.30.
25) **Choice D is correct.** 8.G.B.7 Interest: $I = 200000 \times 0.04 \times 30 = \$240{,}000$.
26) **Choice D is correct.** 8.EE.A.1 Coefficients: $\frac{12}{3} = 4$. Variables: $a^{6-2} = a^4$ and $b^{-2-3} = b^{-5}$. Result: $4a^4b^{-5}$ or $\frac{4a^4}{b^5}$.

Hi, Organized Solver!

◇ You practiced Grade 8 skills that often require more than one step. That means your written work matters. ◇

⋆ **Remember this:** Showing work is not extra. It is how you track your thinking, find errors, and prove that your answer did not happen by luck. You practiced across 8 full Grade 8 practice tests, and that repeated effort matters. ⋆

Organized Work Habits

- **One Line Per Step:** Keep the path readable.
- **Box the Answer:** Make the final result easy to find.
- **Use Labels:** Tell what each value represents.
- **Check the Path:** Follow your steps backward if needed.

Grade 8 test-day tip: When a problem has several steps, write less on each line. Space makes checking easier.

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

Jay Daie

Your Organized-Work Coach

PRACTICE TODAY, SUCCEED TOMORROW!

GRADE 8

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror 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.

BUILD SKILLS & BOOST CONFIDENCE
Strengthen understanding and feel prepared for test day.

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!

2 EXTRA ONLINE PRACTICE TESTS INCLUDED!

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

testinar.com/math8

PRACTICE. PREPARE. SUCCEED.

Testinar | More Practice. More Confidence. Better Results.