

5 Full-Length Illinois IAR Grade 8 Math Practice Tests

Extra Practice for Test Day Success

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Published by View Math Education

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5 Practice Tests

🌱 Grade 8 Mathematics 🌱



Welcome!

*This book contains **5 full-length practice tests** to prepare you for your Grade 8 math assessment. Each test covers every major topic you need to know:*

📖 Irrational Numbers 📖 Powers & Scientific Notation

📖 Linear Equations 📖 Functions

📖 Geometry 📖 Data & Relationships

With five tests, you'll have plenty of opportunity to identify weak areas, practice them, and build real confidence.

The more you practice, the more prepared you'll be.

“ Five tests give you a real advantage. Use each one to get stronger before the real thing! ”



How to Use This Book

A 5-week plan for effective test preparation

What's Inside

- **5 Full-Length Practice Tests** — each covers all 6 chapters of Grade 8 math: irrational numbers, exponents & scientific notation, linear equations, functions, geometry, and data analysis.
- **Detailed Answer Explanations** — every question includes a complete step-by-step solution to help you learn from your mistakes.
- **Formula Reference Sheet** — all the key Grade 8 formulas and concepts organized in one page for quick access.
- **Test Tracker** — record scores and track improvement across all five tests.

Your 5-Week Study Path



Space tests one week apart. Use the days between to study the topics you missed.

Types of Questions

- **Multiple Choice:** Four answer options. Work the problem yourself first, then match your answer. Eliminate clearly wrong options to narrow your choices.
- **Short Answer & Constructed Response:** Write your full solution. Show all equations, substitutions, and simplification steps. Partial credit is given for correct work even if the final answer is missing or wrong.
- **Graphing & Data:** Plot points, draw lines, and interpret graphs and scatter plots. Label axes clearly and use a ruler for straight lines.



Tip: Five tests is enough to see real progress. Space them out, study between them, and always review the full explanation for every problem you get wrong.

PREVIEW



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💡 Test-Taking Tips 💡

Five key strategies for success

Five Strategies for Every Problem

1. **Read carefully.** Don't skim. Read every word of the problem and identify exactly what is being asked before you start calculating.
2. **Estimate first.** Before solving, make a rough estimate. This helps you catch major errors in your final answer.
3. **Show your work.** Write the formula, substitute values, and simplify step by step. This earns partial credit and reduces mistakes.
4. **Check your answer.** Plug your result back into the original equation or condition. Does it work?
5. **Manage your time.** If you're stuck for more than 2 minutes, skip the problem and come back later. Don't let one question eat your time.

Common Mistakes to Watch For

-  **Negative exponents:** $a^{-n} = \frac{1}{a^n}$, not a negative number.
-  **Slope sign:** When a line goes down from left to right, the slope is negative.
-  **Linear vs. nonlinear:** A function is linear only if its rate of change is constant.
-  **Transformations:** Rotation $\neq$ reflection. Know which changes orientation.
-  **Scatter plots:** Correlation does not mean causation. Read the question carefully.

 Don't Forget

- Circle keywords in the problem: “approximately,” “exactly,” “which equation”
- For word problems, translate sentences into equations one phrase at a time
- Draw diagrams for geometry problems even if one isn't provided
- Convert between forms (fraction $\leftrightarrow$ decimal $\leftrightarrow$ percent) when it helps
- For systems of equations, check your solution in both equations



“After each practice test, go back to every problem you got wrong and figure out *where* your approach broke down. That single habit makes the biggest difference.”



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Grade 8 Formula Reference

Keep this page handy — you may use it during your practice tests!

Exponent Rules

$$a^m \cdot a^n = a^{m+n} \quad (a^m)^n = a^{mn} \quad (ab)^n = a^n \cdot b^n$$
$$\frac{a^m}{a^n} = a^{m-n} \quad a^0 = 1 \quad (a \neq 0) \quad a^{-n} = \frac{1}{a^n}$$

Lines & Linear Equations

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$

m = slope b = y -intercept

Slope-intercept: $y = mx + b$

Parallel lines: same slope

Proportional: $y = mx$

Proportional: passes through origin

Scientific Notation

$a \times 10^n$ where $1 \leq |a| < 10$

Multiply: add exponents

Divide: subtract exponents

Roots & Number Sense

Perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

Perfect cubes: 1, 8, 27, 64, 125 $\sqrt{2} \approx 1.414$ $\sqrt{3} \approx 1.732$ $\pi \approx 3.14159$

Pythagorean Theorem & Distance

$a^2 + b^2 = c^2$ c = hypotenuse (longest side of a right triangle) **Distance:** $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Volume Formulas

Cylinder $V = \pi r^2 h$ **Cone** $V = \frac{1}{3} \pi r^2 h$ **Sphere** $V = \frac{4}{3} \pi r^3$

Angle Relationships

Triangle angle sum: 180°

Exterior angle = sum of two remote interior angles

Parallel lines + transversal: Alternate interior angles are equal • Co-interior angles sum to 180°

Functions

Each input $\rightarrow$ exactly one output **Vertical line test:** if any vertical line hits graph more than once $\Rightarrow$ not a function

Linear: constant rate of change ($y = mx + b$)

Nonlinear: rate of change varies

Transformations

Translation: slide

Reflection: flip

Rotation: turn

Dilation: resize

Congruent = same shape & size

Similar = same shape, proportional size



Tip: Bookmark this page! Review it before each test so these formulas become second nature.



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PRACTICE TEST

1

Practice Test 1

 10 Questions

Before You Start

- ✓ *Read each question carefully before choosing your answer.*
- ✓ *Show your work on scratch paper when you need to.*
- ✓ *Skip hard questions and come back to them later.*
- ✓ *Check your answers when you're done.*
- ✓ *Take your time — there's no rush!*

★ *You've Got This!* ★

Do your best and show what you know!



1. A student claims that $\sqrt{36}$ is irrational because it involves a square root. What is wrong with this reasoning?

- (A) Square roots are always rational. (B) $\sqrt{36} = 6$, which is a whole number and therefore rational.
- (C) $\sqrt{36}$ is not a real number. (D) Only cube roots can be irrational.

2. What is $0.\overline{5}$ written as a fraction in simplest form?

- (A) $\frac{5}{10}$ (B) $\frac{5}{9}$
- (C) $\frac{1}{2}$ (D) $\frac{1}{5}$

3. Which is the best approximation of $\sqrt{30}$ to one decimal place?

- (A) 5.1 (B) 5.3
- (C) 5.5 (D) 5.8

4. What is $(\sqrt{5})^2$?

- (A) $\sqrt{10}$ (B) 25
- (C) 5 (D) 2.236

5. Evaluate $\sqrt{169} - \sqrt[3]{27}$.

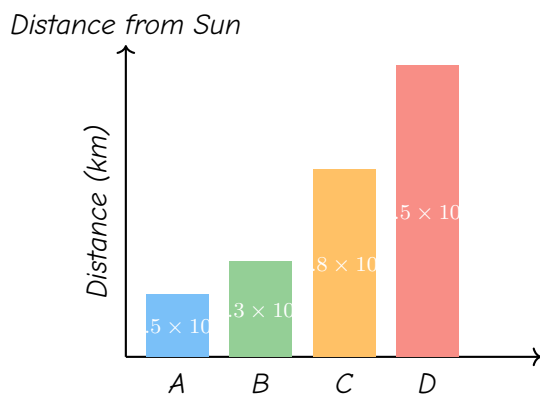
- (A) 10 (B) 142
- (C) 16 (D) 7



6. How many times as large is 6×10^7 compared to 3×10^4 ?

Your Answer:

7. The bar chart compares the distances of four planets from the Sun. Which planet is approximately 10 times farther from the Sun than Planet A?



(A) Planet B

(B) Planet C

(C) Planet D

(D) None of the planets

8. A painter paints 3 rooms in 6 hours. At this rate, how many hours will it take to paint 8 rooms?

Your Answer:

9. What is the slope of a horizontal line?

(A) 1

(B) -1

(C) 0

(D) Undefined



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10. Look at the two expressions on the balance. What can you conclude?

$$\boxed{3(x+2)} \quad = \quad \boxed{3x+6}$$


(A) $x = 0$

(B) $x = 2$

(C) No solution

(D) Infinitely many solutions



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★ End of Practice Test 1 ★

Great job finishing the test!

My Score

I got _____ out of 10 questions right.

*Check your answers in the **Answer Key** at the back of the book.*

 *Review any questions you missed. That's how we learn!*

Answer Key & Explanations



Answer Key

First try each test on your own, then check your work here.

Practice Test 1 — Answer Key

1 B

2 B

3 C

4 C

5 A

6 2,000 times

7 C

8 16 hours

9 C

10 D

Time to Learn!

Review the explanations below, *especially for the questions you missed.*

Understanding why each answer is correct builds stronger problem-solving skills.

Tip: Circle any questions you got wrong, then read their explanation carefully.

Practice Test 1 — Detailed Explanations

1 36 is a perfect square, so $\sqrt{36} = 6$, which is rational. Not all square roots are irrational — only those of non-perfect-squares.

2 Let $x = 0.555\dots$. Then $10x = 5.555\dots$. Subtract: $9x = 5$, so $x = \frac{5}{9}$. This is already in simplest form.



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3 $5.4^2 = 29.16$ and $5.5^2 = 30.25$. Since 30 is very close to 30.25, $\sqrt{30} \approx 5.5$.

4 By definition, $(\sqrt{5})^2 = 5$. Squaring a square root gives back the original number.

5 $\sqrt{169} = 13$ and $\sqrt[3]{27} = 3$. So $13 - 3 = 10$.

6 $\frac{6 \times 10^7}{3 \times 10^4} = 2 \times 10^3 = 2,000$.

7 Planet A is 1.5×10^8 km away. Ten times that is 1.5×10^9 km, which matches Planet D.

8 Rate = $\frac{6}{3} = 2$ hours per room. For 8 rooms: $2 \times 8 = 16$ hours.

9 A horizontal line has no rise, so $m = \frac{0}{\text{run}} = 0$.

10 $3(x + 2) = 3x + 6$ simplifies to $3x + 6 = 3x + 6$, which is always true. Infinitely many solutions.



Well done checking your answers!

Keep practicing to strengthen your skills.



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THANK YOU

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- ✓ *Hundreds of practice problems*
- ✓ *Complete answer key with explanations*
- ✓ *Colorful visuals and step-by-step examples*
- ✓ *Reference sheets and progress trackers*

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