

3 Indiana ILEARN Grade 8 Math Practice Tests

Full-Length Test Prep with Detailed Answer Explanations

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3 Practice Tests

Welcome!

This book contains **3 full-length practice tests** designed to prepare you for your Grade 8 math assessment. Each test covers all six major topics:

📖 Irrational Numbers 📖 Powers & Scientific Notation

📖 Linear Equations 📖 Functions

📖 Geometry 📖 Data & Relationships

Every test includes **detailed answer explanations** so you can learn from each question.

Practice builds confidence. Confidence builds results.

“ Three tests is a great start. Take your time, review each answer, and watch yourself improve! ”





How to Use This Book



Get the most out of your 3 practice tests

What's Inside

- **3 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** — not just the correct answer, but a step-by-step solution showing the reasoning behind every problem.
- **Formula Reference Sheet** — key formulas and concepts you need for the tests, all in one place.
- **Test Tracker** — record your scores and monitor your improvement across all three tests.

Suggested Study Schedule

Space your tests at least one week apart to allow time for review:

- Test 1** Take this test untimed. Focus on understanding each problem. After finishing, review the answer key and note which topics need work.
- Test 2** Set a timer (about 70 minutes). Practice pacing yourself. Compare your results with Test 1 — which topics improved?
- Test 3** Full test conditions: timed, quiet space, no notes. Treat it like the real test day. Compare with Test 1 to see your growth.

 Types of Questions

• **Multiple Choice:** Four answer options — only one is correct. Work the problem first, then match your answer to the choices.

 **Short Answer & Constructed Response:** Show your full solution: equations, substitutions, simplifications, and a clear final answer.

 **Graphing & Data:** Some questions require plotting points, drawing lines, or interpreting graphs and scatter plots. Always label axes and use a straightedge.



Tip: After each test, don't just check your score — read the full explanation for every problem you got wrong. Understanding why the correct method works is what builds lasting skills.



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💡 Test-Taking Tips 💡

Strategies to help you perform your best

How to Approach Every Problem

- 1. Read the entire problem carefully.** Identify what is given and what is being asked. Underline key words like "simplify," "solve," or "graph."
- 2. Set up your work before calculating.** Write the formula, draw a diagram, or set up the equation before substituting numbers.
- 3. Solve step by step.** Show every operation. Label your units and variables.
- 4. Check your answer.** Plug it back into the original equation. Ask yourself: does this answer make sense?
- 5. Re-read the question.** Make sure you answered exactly what was asked.

Common Grade 8 Mistakes to Avoid

-  **Exponent rules:** $a^m \cdot a^n = a^{m+n}$, but $(a^m)^n = a^{mn}$. Don't mix these up.
-  **Slope:** Rise over run, not run over rise. Check the sign of both differences.
-  **Functions:** One input $\rightarrow$ one output. Use the vertical line test for graphs.
-  **Scientific notation:** The coefficient must be ≥ 1 and < 10 .
-  **Volume:** Cone = $\frac{1}{3}$ of cylinder; sphere = $\frac{4}{3}\pi r^3$. Know which formula to use.

 Good Test Habits

- Answer the questions you know first, then go back to harder ones
- Show your work on every problem — even multiple-choice
- Use estimation to check if your answer is reasonable
- On graphing questions, plot at least 3 points before drawing a line
- Never leave a question blank — eliminate wrong choices and make your best guess



“The most important thing after each practice test is reviewing your mistakes. Don’t just look at the right answer — understand **why** the correct method works and **where** your approach went wrong.”



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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. The decimal expansion of a number is $0.45454545\dots$. Is this number rational or irrational?

Your Answer:

2. A square garden has an area of 35 square feet. Estimate the side length to one decimal place.

Your Answer:

3. Estimate $10 - 2\sqrt{5}$ to one decimal place.

Your Answer:

4. What is the value of $(10^2)^3$?

Your Answer:

5. Which equation has exactly one real solution?

(A) $x^2 = 16$

(B) $x^3 = 8$

(C) $x^2 = 100$

(D) $x^2 = 4$

6. Simplify $(7 \times 10^{-3})(8 \times 10^{-2})$. Write in proper scientific notation.

(A) 56×10^{-5}

(B) 5.6×10^{-5}

(C) 5.6×10^{-4}

(D) 5.6×10^6



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7. If $y = kx$ and $y = 36$ when $x = 9$, what is y when $x = 5$?

(A) 15

(B) 20

(C) 25

(D) 30

8. A swimmer covers 100 meters in 50 seconds and 200 meters in 100 seconds. The slope of distance vs. time is:

(A) 0.5 m/s

(B) 2 m/s

(C) 50 m/s

(D) 100 m/s

9. Find the y -intercept of the line through $(-2, 8)$ and $(3, -7)$.

Your Answer:

10. The first step in solving a word problem with a system is:

(A) Graph both lines.

(B) Multiply the equations together.

(C) Define variables for the unknowns.

(D) Guess the answer and check.



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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 Rational

2 ≈ 5.9 feet

3 ≈ 5.5

4 1,000,000

5 B

6 C

7 B

8 B

9 2

10 C

💡 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 The digits 45 repeat, so $0.\overline{45} = \frac{45}{99} = \frac{5}{11}$. A repeating decimal is always rational.

2 Side = $\sqrt{35}$. $5.9^2 = 34.81$ and $6.0^2 = 36$. Since 35 is closer to 34.81, $\sqrt{35} \approx 5.9$.

3 $\sqrt{5} \approx 2.236$, so $2\sqrt{5} \approx 4.472$. Then $10 - 4.472 = 5.528 \approx 5.5$.



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4 $(10^2)^3 = 10^6 = 1,000,000$.

5 $x^3 = 8$ has one real solution, $x = 2$. Equations of the form $x^2 = p$ (with $p > 0$) have two solutions.

6 $7 \times 8 = 56$ and $10^{-3} \times 10^{-2} = 10^{-5}$. Then $56 \times 10^{-5} = 5.6 \times 10^{-4}$.

7 $k = \frac{36}{9} = 4$. When $x = 5$: $y = 4(5) = 20$.

8 $m = \frac{200-100}{100-50} = \frac{100}{50} = 2$ m/s.

9 $m = \frac{-7-8}{3-(-2)} = \frac{-15}{5} = -3$. Using $(-2, 8)$: $8 = -3(-2) + b$, so $8 = 6 + b$ and $b = 2$.

10 Always start by defining variables (e.g., let $x = \dots$, $y = \dots$) so you can write equations.



Well done checking your answers!

Keep practicing to strengthen your skills.



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THANK YOU

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The complete book includes:

- ✓ *All chapters and topics*
- ✓ *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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