

# 5 Full-Length Michigan M-STEP 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:**  $180^\circ$

**Exterior angle** = sum of two remote interior angles

**Parallel lines + transversal:** Alternate interior angles are equal • Co-interior angles sum to  $180^\circ$

### 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



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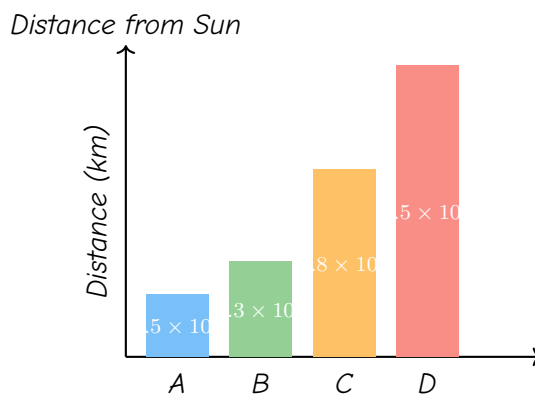
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6. How many times as large is  $6 \times 10^7$  compared to  $3 \times 10^4$ ?

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



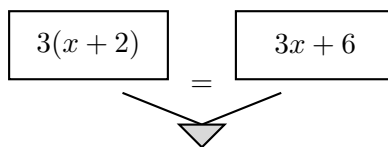
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10. Look at the two expressions on the balance. What can you conclude?

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


(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  $1.5 \times 10^8$  km away. Ten times that is  $1.5 \times 10^9$  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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### Get the Full Book!

*This preview shows just a small sample of what's inside.*

*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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