

5 Full-Length Massachusetts MCAS Grade 8 Math Practice Tests

Extra Practice for Test Day Success

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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



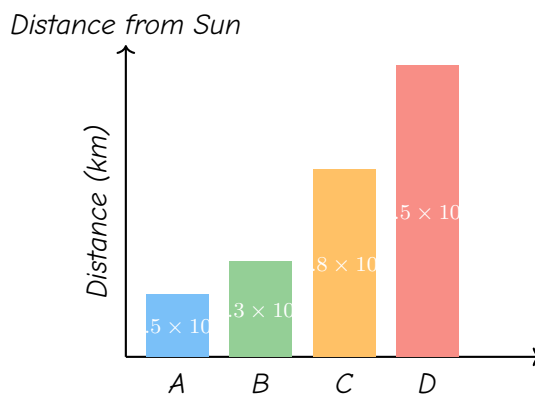
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6. How many times as large is 6×10^7 compared to 3×10^4 ?

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?

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


(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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- ✓ *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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