

10 Montana MAST

GRADE
8
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

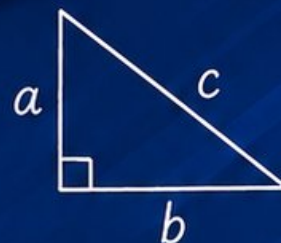
10 PRINTED
TESTS



2 ONLINE
TESTS



- ✓ Build Confidence
- ✓ Master Key Math Skills
- ✓ Answer Explanations for Every Question
- ✓ Test-Taking Strategies That Work



$$y = mx + b$$



$$3x - 7 = 2(x + 5)$$
$$x = 17$$

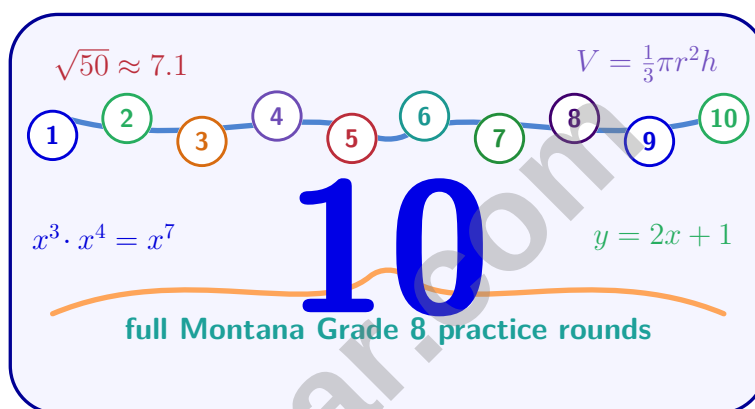


USE THESE TWO
**ADDITIONAL ONLINE
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER
THE PRINTED TESTS
IN THIS BOOK.

10 Montana MAST Grade 8 Math Practice Tests

Montana Grade 8 MAST Practice for big-sky practice for functions, scale, exponent reasoning, algebra, geometry, and probability



Ten complete 40-question Grade 8 MAST practice rounds with linear relationships, scientific notation, real numbers, equations, functions, geometry, data analysis, probability, answer keys, and clear explanations for every item.

Jay Daie and Reza Nazari



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Welcome, Montana Grade 8 Problem Solver!

Ten focused rounds for sharper Montana MAST math thinking

This book gives you ten full Grade 8 MAST math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

Grade 8 standards focus: This page supports **Composite Figures: Area and Perimeter** (8.G.7): Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. A second useful connection is **Building Linear Functions** (8.F.4): Construct a function to model a linear relationship between two quantities. Determine rate of change and initial value from a description, table, or graph.

Your Montana 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.

Read

Model

Verify

How to Use This Book

A ten-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 a proportion, equation, diagram, number line, 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.

Grade 8 standards focus: Keep the routine connected to **Probability of Simple and Compound Events** (8.G.7): Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. It also prepares you for **Similarity and Dilations** (8.G.4): Understand that a two-dimensional figure is similar to another if the second can be obtained by a sequence of rotations, reflections, translations, and dilations.

Montana 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?

Ten Montana MAST tests, 400 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading.
Tests 4–6	Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.
Tests 7–9	Data analysis, probability, mixed review, stamina, and choosing efficient strategies.
Test 10	A final Montana round to show growth across the whole book.
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.

Grade 8 standards focus: Use these habits while practicing **Turning Repeating Decimals into Fractions** (8.NS.1): Convert a decimal expansion which repeats eventually into a rational number. Another recurring target is **Volume of Cylinders, Cones, and Spheres** (8.G.9): Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.



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Table of Contents

★ Practice Test 1	_____	14
★ Practice Test 2	_____	30
★ Practice Test 3	_____	48
★ Practice Test 4	_____	64
★ Practice Test 5	_____	80
★ Practice Test 6	_____	97
★ Practice Test 7	_____	115
★ Practice Test 8	_____	130
★ Practice Test 9	_____	146
★ Practice Test 10	_____	161
Practice Test Answer Keys	_____	177
Practice Test Answers and Explanations	_____	183

1) Simplify $\left(\frac{x}{y}\right)^2$ where $y \neq 0$.

☐ A. $\frac{2x}{2y}$

☐ B. $\frac{x}{y^2}$

☐ C. $\frac{x^2}{y^2}$

☐ D. $\frac{x^2}{y}$

2) A cylinder has radius 5 cm and height 12 cm. What is the lateral surface area (side only, not including the bases)?

☐ A. $60\pi \text{ cm}^2$

☐ B. $120\pi \text{ cm}^2$

☐ C. $150\pi \text{ cm}^2$

☐ D. $300\pi \text{ cm}^2$

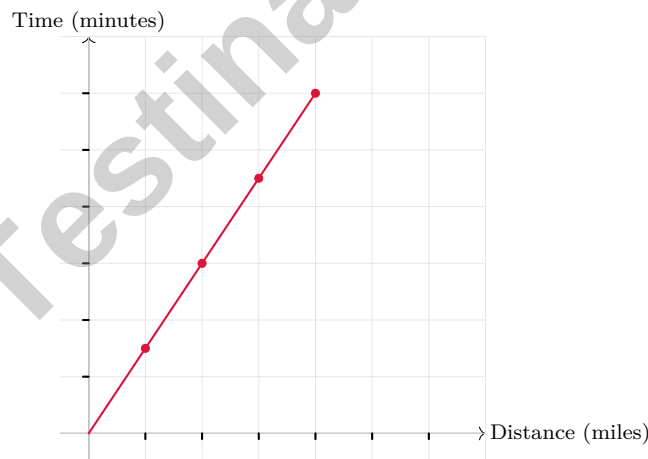
3) A cone has the same radius and height as a cylinder. If the cylinder's volume is 450 cubic meters, what is the cone's volume?

☐ A. 150 m^3

☐ B. 225 m^3

☐ C. 900 m^3

☐ D. 1350 m^3



4)

Using the linear model, which distance-time pair should be predicted MOST reliably?

☐ A. 5 miles in about 7.5 minutes

☐ C. 2.5 miles in about 3.75 minutes

☐ B. 0.5 miles in about 0.75 minutes

☐ D. 10 miles in about 15 minutes



- 5) A loan of \$5,000 at 5% simple interest is repaid in 4 equal annual installments. What is the total amount paid?

☐ A. \$5,000 ☐ C. \$6,000
☐ B. \$5,500 ☐ D. \$6,250

- 6) Solve by substitution: $\begin{cases} x = y - 4 \\ 2x + 3y = 2 \end{cases}$

☐ A. (2, 6) ☐ C. (1, 5)
☐ B. (0, 4) ☐ D. (-2, 2)

- 7) A cube-shaped storage container has a volume of 512 cubic feet. What is the side length of the cube?

- 8) Multiply: $(x + 7)(x - 1)$

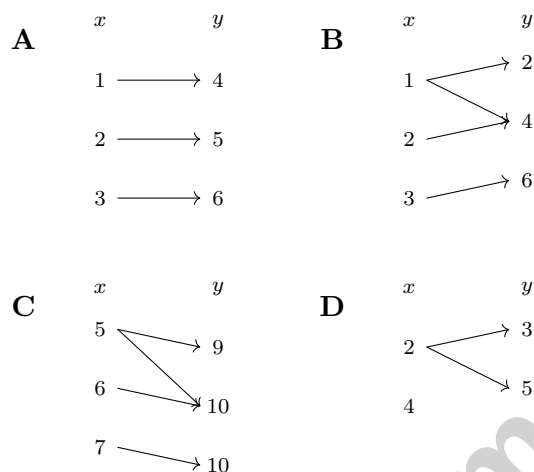
☐ A. $x^2 + 6x - 7$ ☐ C. $x^2 + 7x - 1$
☐ B. $x^2 - 7$ ☐ D. $x^2 + 8x - 7$

- 9) Compute $(2.5 \times 10^3) \times (4 \times 10^2)$ and write your answer in scientific notation.

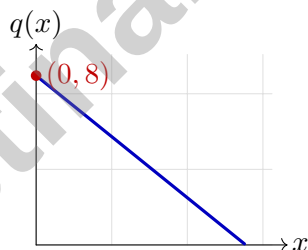


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10) Which mapping diagram represents a function?

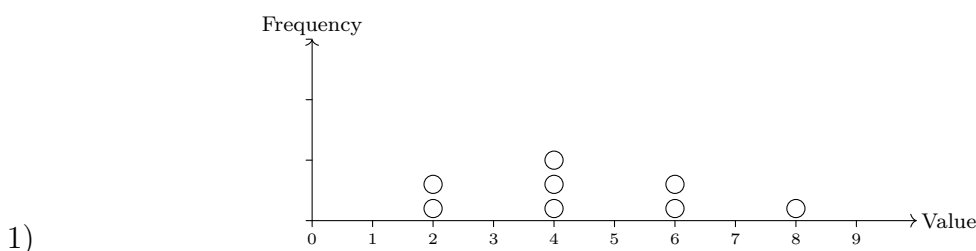


11) Two linear functions: $p(x) = -x + 10$ (verbal: “starts at 10, decreases by 1 each step”). Function q shown in graph through $(0, 8)$ with slope -1.5 . Which has more negative slope?



- ☐ A. Function p
☐ C. Equal negative slopes
- ☐ B. Function q
☐ D. Not comparable





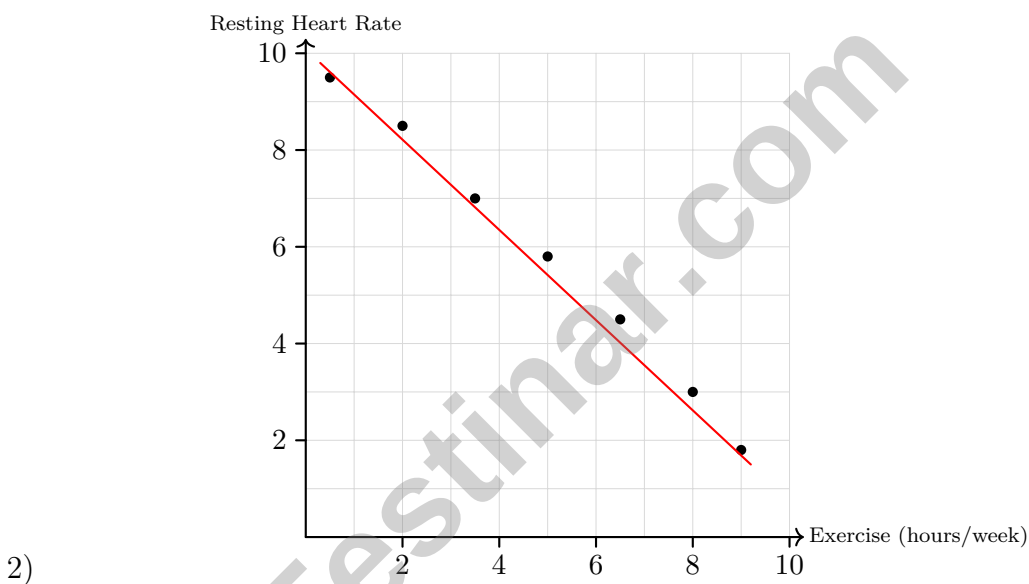
Based on the dot plot, find the MAD. (Values: 2, 2, 4, 4, 4, 6, 6, 8; mean = 4.5)

☐ A. $\frac{13}{8} = 1.625$

☐ C. 2

☐ B. 1.5

☐ D. 2.5



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

☐ C. People with higher heart rates exercise less on average

☐ B. Exercise has no effect on heart rate

☐ D. More exercise causes lower heart rates


3) Triangle with vertices at $(1, 0)$, $(3, 0)$, and $(2, 2)$ is dilated by a scale factor of 0.5 from the origin. What is the area ratio of the new triangle to the original?

☐ A. 0.5

☐ C. 2

☐ B. 0.25

☐ D. 4

4) A side job pays a bonus of \$800, invested at 5% simple interest. How long until the account grows to \$880?

☐ A. 1 year

☐ C. 3 years

☐ B. 4 years

☐ D. 2 years

5) If a is rational and b is irrational, which must be true?

☐ A. $a + b$ is rational

☐ C. $b - a$ is rational

☐ B. $a \times b$ is rational

☐ D. $a + b$ is irrational

6)
$$\begin{array}{r} x = 0.\overline{26} \\ 100x = 26.\overline{26} \\ 100x - x = ? \end{array} \longrightarrow 99x = 26$$

Which multiplication step is shown here?

☐ A. Multiply by 10 to shift 1 decimal place.

☐ C. Multiply by 1000 to shift 3 decimal places.

☐ B. Multiply by 26 to isolate the repeating part.

☐ D. Multiply by 100 to shift 2 decimal places.

7) Which is a rational number?

☐ A. $\sqrt{11}$
☐ C. $\sqrt{49}$
☐ B. $\sqrt{20}$
☐ D. $\sqrt{23}$


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1) A figure is dilated by a scale factor of 3. How does the length of each side change?

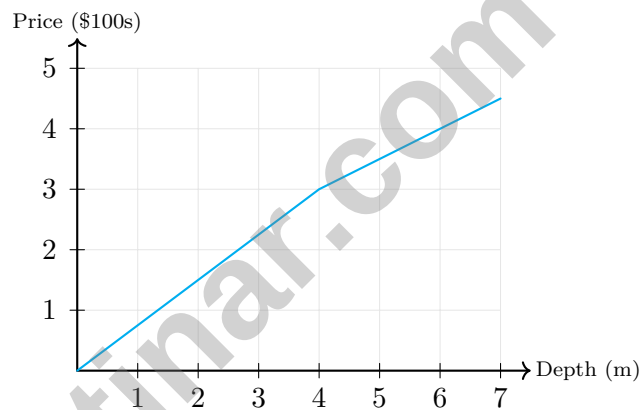
☐ A. Divided by 3

☐ C. Unchanged

☐ B. Multiplied by 3

☐ D. Increased by 3 inches

2) What two positive integers multiply to 12 and add to 7?



3)

The graph shows well-drilling cost vs. depth. Why does the slope change at 4 meters depth?

☐ A. The drilling cost stays the same at all depths

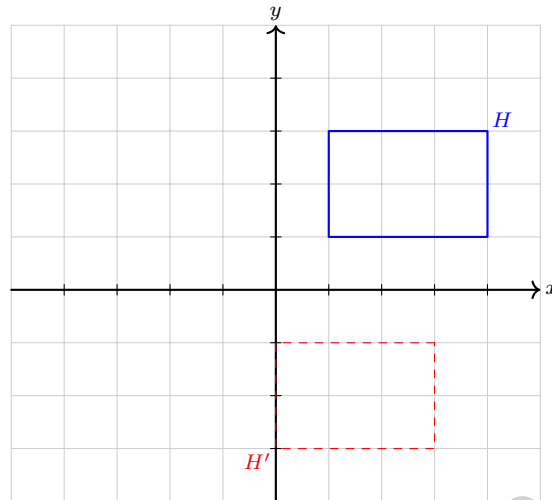
☐ C. The drilling stops at 4 meters

☐ B. Different rock layers require different rates

☐ D. Cost actually decreases, shown by a negative slope



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4)

Rectangle H (blue) is transformed to rectangle H' (red). Which sequence of transformations applies?

- ☐ A. Reflect across y -axis, translate right 3
☐ B. Rotate 180° about the origin, translate right 3
☐ C. Reflect across x -axis, translate left 1
☐ D. Translate down 4, reflect across y -axis
- 5) A company's profit increases by \$500 for every unit sold. What is the slope of the profit-versus-units-sold line?
- ☐ A. $\frac{1}{500}$ per unit
☐ B. \$1000 per unit
☐ C. 500 units
☐ D. \$500 per unit
- 6) Sarah is 5 years older than Tom. In 5 years, the sum of their ages will be 45. How old is Tom now?
- ☐ A. 12
☐ B. 18
☐ C. 15
☐ D. 20



Montana MAST 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 Montana MAST practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice C is correct.** **(8.EE.1)** Apply power to numerator and denominator: $\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}$.
- 2) **Choice B is correct.** **(8.G.9)** Lateral surface area $= 2\pi rh = 2\pi(5)(12) = 120\pi$ cm².
- 3) **Choice A is correct.** **(8.G.9)** Since $V_{\text{cone}} = \frac{1}{3}V_{\text{cyl}}$, the cone's volume is $\frac{1}{3} \times 450 = 150$ m³.
- 4) **Choice C is correct.** **(8.SP.3)** Predictions are most reliable within or near the observed data range (1–4 miles). Option (C) uses 2.5 miles, which is centered in this range; (D) is far extrapolation.
- 5) **Choice C is correct.** **(8.G.7)** Interest: $I = 5000 \times 0.05 \times 4 = \$1,000$. Total: $5000 + 1000 = \$6,000$.
- 6) **Choice D is correct.** **(8.EE.8)** Substitute $x = y - 4$ into $2x + 3y = 2$: $2(y - 4) + 3y = 2$, so $2y - 8 + 3y = 2$, giving $5y = 10$ and $y = 2$. Then $x = 2 - 4 = -2$. Solution: $(-2, 2)$.
- 7) **The correct answer is 8.** **(8.EE.2)** $e^3 = 512$, so $e = \sqrt[3]{512} = 8$ feet.
- 8) **Choice A is correct.** **(8.EE.7)** FOIL: $(x + 7)(x - 1) = x^2 - x + 7x - 7 = x^2 + 6x - 7$.
- 9) **The correct answer is 1×10^6 .** **(8.EE.4)** Multiply coefficients: $2.5 \times 4 = 10$. Add exponents: $10^{3+2} = 10^5$. Result: $10 \times 10^5 = 1 \times 10^6$.
- 10) **Choice A is correct.** **(8.F.1)** Option A has each input mapping to exactly one output. Option B has input 1 mapping to two outputs. Option C has input 5 mapping to two outputs. Option D has input 2 mapping to two outputs.
- 11) **Choice B is correct.** **(8.F.2)** Slope of p : -1 . Slope of q : -1.5 . Since $-1.5 < -1$, function q is more negative.
- 12) **Choice C is correct.** **(8.F.3)** $y = x^2 + 7$ has x squared, making it nonlinear (quadratic). The other three are linear functions in the form $y = mx + b$.
- 13) **The correct answer is 200.** **(8.EE.5)** Compute $50 \times 4 = 200$.
- 14) **Choice A is correct.** **(8.F.4)** Slope: $m = \frac{5-1}{3-1} = \frac{4}{2} = 2$. Using point $(1, 1)$: $1 = 2(1) + b \Rightarrow b = -1$. Equation: $y = 2x - 1$.
- 15) **Choice A is correct.** **(8.F.5)** The actual graph increases, then decreases, then increases again. The student's error is describing only part of the graph instead of the full interval.
- 16) **Choice C is correct.** **(8.G.2)** Add 3 to each x -coordinate and subtract 1 from each y -coordinate: $(1 + 3, 2 - 1) = (4, 1)$, $(4 + 3, 2 - 1) = (7, 1)$, $(2.5 + 3, 4 - 1) = (5.5, 3)$.
- 17) **Choice A is correct.** **(8.G.8)** $d = \sqrt{(7-0)^2 + (24-0)^2} = \sqrt{49 + 576} = \sqrt{625} = 25$.
- 18) **The correct answer is B, E.** **(8.G.7)** There are 10 marbles total. B is true because $P(\text{blue}) = \frac{3}{10}$. E is true because $P(\text{red or blue}) = \frac{5+3}{10} = \frac{8}{10} = \frac{4}{5}$. A is false because $P(\text{red}) = \frac{1}{2}$. C is false because $P(\text{green}) = \frac{1}{5}$. D is false because $P(\text{yellow}) = 0$.
- 19) **Choice C is correct.** **(8.G.7)** When a transversal cuts two parallel lines, it creates 8 angles: 4 angles of measure 157° (corresponding and vertical angles) and 4 angles of measure 23° (supplements).
- 20) **Choice C is correct.** **(8.G.9)** Pyramid: $V_{py} = \frac{1}{3} \times 36 \times 6 = 72$ cm³. Cube: $V_c = 6^3 = 216$ cm³. Ratio: $\frac{72}{216} = 1 : 3$.
- 21) **The correct answer is $x = 4$.** **(8.EE.7)** Distribute the 2: $6x - 2 = 4x + 6$. Subtract $4x$ from both sides: $2x - 2 = 6$. Add 2 to both sides: $2x = 8$. Divide by 2: $x = 4$. Verify: $2(3(4) - 1) = 2(11) = 22$ and $4(4) + 6 = 22$ ✓.
- 22) **Choice D is correct.** **(8.SP.1)** The pattern shows: high experience (right) $\rightarrow$ low reaction time (bottom), and low experience (left) $\rightarrow$ high reaction time (top). This is a negative association: as one increases, the other decreases.
- 23) **Choice D is correct.** **(8.SP.4)** D is incorrect: $\frac{32}{80} = 0.40$ is a row-conditional frequency (among teens), not the percentage of all shoppers. The joint relative frequency is $\frac{32}{240} \approx 0.13$. Options A, B, C are correct frequency calculations.
- 24) **Choice A is correct.** **(8.G.3)** Points $(1, 1) \rightarrow (-1, 1)$ and $(3, 3) \rightarrow (-3, 3)$. The y -coordinates are unchanged while x -coordinates negate, confirming reflection across the y -axis.
- 25) **Choice A is correct.** **(8.G.5)** By the exterior angle theorem, an exterior angle of a triangle equals the sum of the two remote interior angles. If those two angles have a sum greater than 90° , the exterior angle is obtuse.



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Hi, Confident Learner!

◇ This full-length book gave you ten complete Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. Grade 8 math can feel big because it connects real numbers and exponents with linear equations, systems, functions, transformations, geometry, and data. ◇

★ **Remember this:** But big topics become manageable when you practice one skill at a time. That is what you have been doing with every test in this book. ★

Confidence Builders

- **Know the Goal:** Identify what the question asks.
- **Use Vocabulary:** Math words point to math actions.
- **Show Work:** Give yourself something to check.
- **Celebrate Effort:** Practice is proof that you are moving.

Grade 8 test-day tip: When reviewing, do not only mark wrong answers. Write one sentence about what you learned from each one.

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

Jay Daie

Your Confidence Coach

PRACTICE TODAY. SUCCEED TOMORROW!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



THIS BOOK INCLUDES:

10

Full-Length
Printed Tests

2

Online
Practice Tests



Detailed Answers
& Explanations



MORE PRACTICE. GREATER RESULTS.

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

WHAT YOU'LL GAIN



Build Confidence

Practice regularly to feel prepared and test-ready.



Master Key Skills

Develop strong math skills and problem solving abilities.



Improve Understanding

Learn with clear explanations and step-by-step solutions.



Test Strategies

Learn proven strategies to approach every question with confidence.



Boost Performance

Apply your knowledge and achieve your best score!

TOPICS COVERED

- ✓ The Number System
- ✓ Expressions & Equations
- ✓ Inequalities
- ✓ Functions
- ✓ Geometry
- ✓ Ratios & Proportions
- ✓ Statistics & Probability
- ✓ Data Analysis
- ✓ Measurement
- ✓ Pythagorean Theorem
- ✓ Surface Area & Volume
- ✓ And More!



2 ONLINE TESTS

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



2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE
REGULARLY



STAY
FOCUSED



SOLVE
CONFIDENTLY



SUCCEED
BRIGHTLY