

3

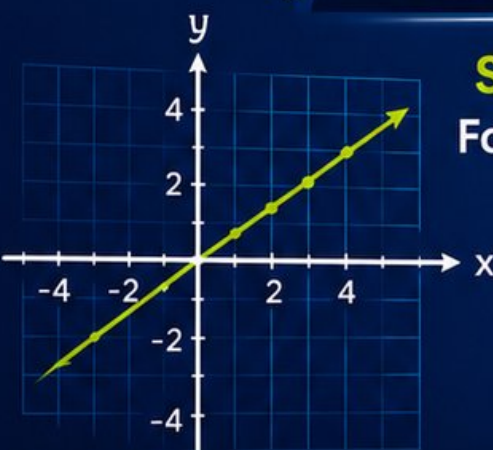
Montana MAST

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$V = s^3$$



$$y = mx + b$$
$$2x + 5 = 13$$
$$x = 4$$



3

**PRINTED
TESTS**



2

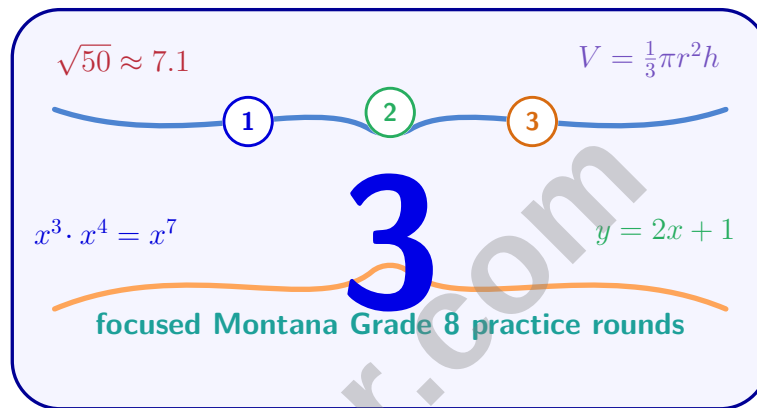
**ONLINE
TESTS**



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

3 Montana MAST Grade 8 Math Practice Tests

Three MAST Practice Tests for Targeted Grade 8 Review



Three complete 40-question Grade 8 MAST practice rounds with real numbers, exponents, scientific notation, equations, functions, transformations, 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!

Three focused rounds for sharper MAST math thinking

This book gives you three full Grade 8 MAST math practice tests. Each round is built to help you recognize structure, reason with real numbers and exponents, analyze linear relationships, connect equations with graphs, and explain your thinking with care.

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 three-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 an exponent rule, equation, graph, transformation, diagram, 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.

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?

Three MAST tests, 120 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Test 3	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
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.



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Table of Contents



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1) Consider a regular heptagon (7-sided polygon). Which is closest to the measure of each interior angle?

☐ A. $\approx 147^\circ$

☐ C. $\approx 138^\circ$

☐ B. $\approx 120^\circ$

☐ D. $\approx 129^\circ$

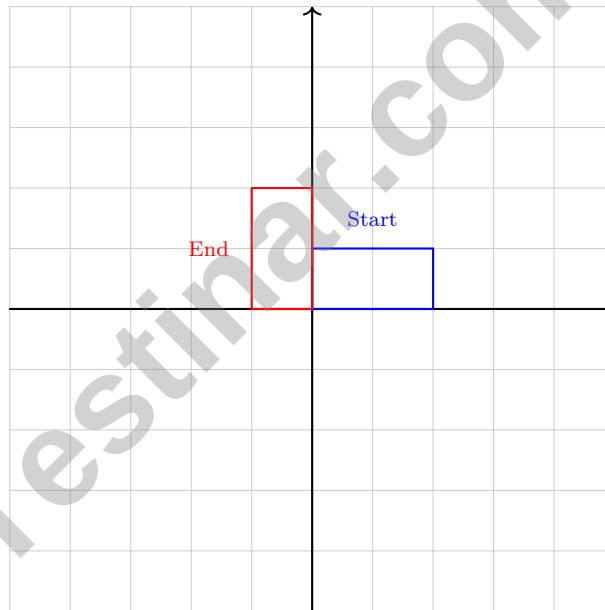
2) A composite solid consists of a cube with edge 2 cm on top of a rectangular prism base with dimensions $4 \times 4 \times 3$ cm (where the cube sits on one face of the prism, sharing a 2×2 face). Ignoring the shared face, what is the combined surface area?

☐ A. 60 cm^2

☐ C. 84 cm^2

☐ B. 76 cm^2

☐ D. 96 cm^2



3)

What transformation maps the blue figure (Start) to the red figure (End)?

☐ A. Reflection across the y -axis

☐ D. 90° clockwise rotation about the origin

☐ B. Reflection across the x -axis

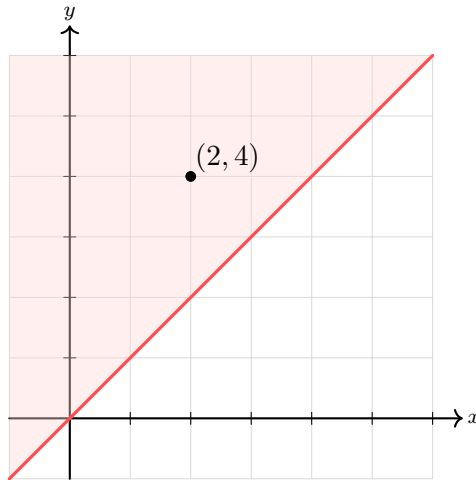
☐ C. 90° counterclockwise rotation about the origin



- 4) A line passes through $(1, 5)$ with slope $\frac{1}{2}$. What is the y -intercept?
- ☐ A. 4 ☐ C. 5
☐ B. $\frac{3}{2}$ ☐ D. $\frac{9}{2}$
- 5) Two equations are given: Equation 1: $2(x + 3) = 2x + 6$ and Equation 2: $2(x + 3) = 2x + 5$. Which statement is true?
- ☐ A. Both have exactly one solution ☐ C. Both have no solution
☐ B. Equation 1 has one solution; Equation 2 has infinitely many solutions ☐ D. Equation 1 has infinitely many solutions; Equation 2 has no solution
- 6) A company allows workers to earn \$12 per hour plus a \$50 bonus. How many hours must they work to earn at least \$170?
- ☐ A. $h < 10$ ☐ C. $h \geq 10$
☐ B. $h > 10$ ☐ D. $h \leq 10$
- 7) In the list 5.2×10^{-2} , 5.2×10^0 , 5.2×10^2 , 5.2×10^{-1} , what is the exponent of the smallest number?



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8)

The test point $(2, 4)$ is marked in the shaded region. Which inequality does this represent?

☐ A. $y > x$

☐ C. $y \geq x$

☐ B. $y < x$

☐ D. $y \leq x$

9) A sphere has a radius of 8 inches. What is its approximate volume? (Use $\pi \approx 3.14$.)

☐ A. 1024.32 in^3

☐ C. 2143.57 in^3

☐ B. 2048.64 in^3

☐ D. 4287.14 in^3

10) A biologist records the relationship between a bacteria colony's age (days) and size (cells). The model is $S = 1500 \cdot 1.2^t$. This is NOT a linear model. Why?

☐ A. The growth rate (slope) is constant across all days

☐ C. The relationship is between days and cells, so it must be linear

☐ B. The number of new cells added increases each day (exponential growth, not constant rate)

☐ D. Exponential models always have more accuracy than linear ones


- 1) A concert venue sells adult tickets for \$15 and student tickets for \$8. If 120 total tickets were sold for \$1,520, how many student tickets were sold?

☐ A. 40 ☐ C. 80
☐ B. 60 ☐ D. 100

- 2) Match each decimal to its fraction:

☐ A. $0.\overline{2} = \frac{2}{9}$ and $0.\overline{22} = \frac{22}{100}$ ☐ C. $0.\overline{2} = \frac{1}{5}$ and $0.\overline{22} = \frac{11}{50}$
☐ B. $0.\overline{2} = \frac{2}{10}$ and $0.\overline{22} = \frac{22}{100}$ ☐ D. $0.\overline{2} = \frac{2}{9}$ and $0.\overline{22} = \frac{22}{99}$

- 3) Is $\sqrt{10}$ greater than or less than 3.1?

☐ A. Cannot be determined ☐ C. Equal to
☐ B. Less than ☐ D. Greater than

- 4) Which is the best estimate of $2\sqrt{7}$?

☐ A. 3.5 ☐ C. 7.0
☐ B. 14.0 ☐ D. 5.2

- 5) Which list is in order from smallest to largest?

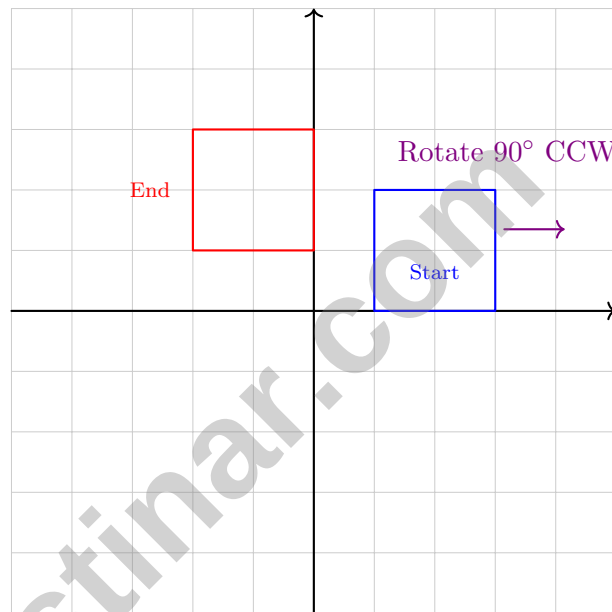
☐ A. 3.2×10^{-5} , 3.2×10^1 , 3.2×10^{-3} ☐ C. 3.2×10^{-3} , 3.2×10^{-5} , 3.2×10^1
☐ B. 3.2×10^1 , 3.2×10^{-3} , 3.2×10^{-5} ☐ D. 3.2×10^{-5} , 3.2×10^{-3} , 3.2×10^1

- 6) A square pyramid has base side length 6 m. The altitude (height from apex perpendicular to base) is 4 m. The slant height (from apex to midpoint of base edge) is approximately 5 m. Which formula gives the lateral surface area?

☐ A. $\frac{1}{2}(6)(4) \times 4 = 48 \text{ m}^2$ ☐ C. $4 \times \frac{1}{2}(6)(5) = 60 \text{ m}^2$
☐ B. $\frac{1}{2}(6)(5) \times 3 = 45 \text{ m}^2$ ☐ D. $4 \times \frac{1}{2}(6)(4) = 48 \text{ m}^2$



- 7) Two similar parallelograms have corresponding side lengths 10 and 15. What is the scale factor from the first to the second?



8)

After the rotation shown, which of the original vertices maps to the new vertex at $(-2, 3)$?

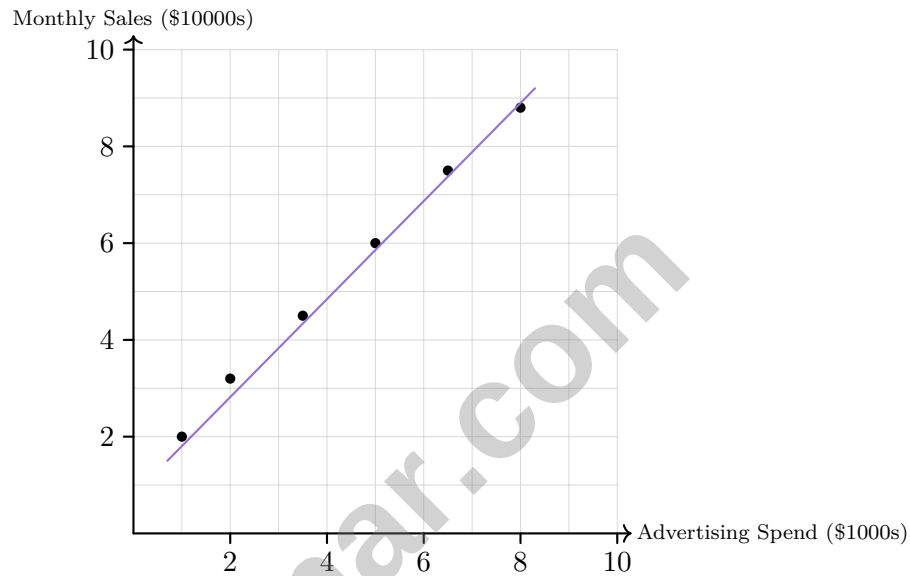
- ☐ A. $(1, 0)$ ☐ C. $(3, 2)$
☐ B. $(3, 0)$ ☐ D. $(1, 2)$



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- 1) Two classes have the same mean test score of 75. Class A has $MAD = 3$, and Class B has $MAD = 8$. What does this tell us?

- ☐ A. Class B has higher individual scores ☐ C. Class A has more consistent scores
☐ B. Class A has more students ☐ D. Class B performed better overall



2)

A business tracks advertising spend versus monthly sales. Based on the trend line, what is the approximate y -intercept (sales with no advertising)?

- ☐ A. \$30,000 ☐ C. \$10,000
☐ B. \$20,000 ☐ D. \$0

- 3) A cube is dilated by a scale factor of 2. If the original cube has volume 27 cm^3 , what is the volume of the dilated cube?

- ☐ A. 54 cm^3 ☐ C. 216 cm^3
☐ B. 108 cm^3 ☐ D. 81 cm^3



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4) If r is a nonzero rational number and i is an irrational number, which expression is definitely rational?

☐ A. $r + i$

☐ B. $r \times i$

☐ C. $\frac{r}{i}$ (where $r \neq 0$)

☐ D. $i - r$

5) Convert $0.\overline{7}$ to a fraction. Which step is incorrect?

☐ A. Let $x = 0.\overline{7}$.

☐ B. $10x = 7.\overline{7}$.

☐ C. $10x - x = 7.\overline{7} - 0.\overline{7} = 7$ is wrong; should be 0.7 .

☐ D. $9x = 7$, so $x = \frac{7}{9}$.

6) Which best approximates $\sqrt{50}$?

☐ A. 6.5

☐ B. 7.5

☐ C. 5.0

☐ D. 7.1

7) A square tile has side length 5 cm. The diagonal is $5\sqrt{2}$ cm. What is the best estimate of the diagonal?

☐ A. 5.5 cm

☐ B. 6.5 cm

☐ C. 7.1 cm

☐ D. 10.0 cm

8) Sarah wants to buy a car for \$15,000. She can pay cash or finance it at 7% APR over 5 years. What is the total finance cost (interest only)?

☐ A. \$1,050

☐ B. \$2,100

☐ C. \$5,250

☐ D. \$10,500



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 D is correct.** (8.G.5) The sum for a heptagon is $(7 - 2) \times 180 = 900^\circ$. Each angle is $\frac{900}{7} = 128.57\dots^\circ$, which rounds to $\approx 129^\circ$.
- 2) **Choice D is correct.** (8.G.9) The rectangular prism has surface area $2(16 + 12 + 12) = 80 \text{ cm}^2$. The cube has surface area $6(2^2) = 24 \text{ cm}^2$. The shared 2×2 face is counted twice, so subtract $2(4)$. The composite surface area is $80 + 24 - 8 = 96 \text{ cm}^2$.
- 3) **Choice C is correct.** (8.G.1) Using $(x, y) \rightarrow (-y, x)$: $(2, 0) \rightarrow (0, 2)$, $(2, 1) \rightarrow (-1, 2)$, matching the End figure.
- 4) **Choice D is correct.** (8.EE.6) Using $y = mx + b$: $5 = \frac{1}{2}(1) + b$, so $5 = \frac{1}{2} + b$, thus $b = \frac{9}{2}$.
- 5) **Choice D is correct.** (8.EE.7) Eq. 1: Expand $2x + 6 = 2x + 6$ (identity, infinitely many). Eq. 2: Expand $2x + 6 = 2x + 5 \Rightarrow 6 = 5$ (false, no solution).
- 6) **Choice C is correct.** (8.EE.7) Set up: $12h + 50 \geq 170$. Subtract 50: $12h \geq 120$. Divide by 12: $h \geq 10$ hours.
- 7) **The correct answer is -2.** (8.EE.3) With the same coefficient, the smallest power has the smallest exponent: -2.
- 8) **Choice C is correct.** (8.G.8) At $(2, 4)$: $4 \geq 2$ is TRUE. The SOLID line shows $\geq$. Shading ABOVE the line confirms $y \geq x$.
- 9) **Choice C is correct.** (8.G.9) $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 512 = 2143.57 \text{ in}^3$.
- 10) **Choice B is correct.** (8.SP.3) In a linear model (8.SP.3), the rate of change is constant—the same number of cells are added each day. Here, the exponent t makes the rate accelerate: day 1 might add 300 cells, day 2 adds 360 cells, etc. This violates the constant-slope assumption of linear models.
- 11) **Choice C is correct.** (8.G.7) Avoiding 12% interest is better than earning 6% return. For the same \$1,500 over 5 years, paying down 12% debt avoids about \$900 of simple interest, while a 6% investment earns about \$450 of simple interest.
- 12) **Choice C is correct.** (8.EE.1) Check each: (A) $x^5 \neq x^6$; (B) $x^6 \neq x^5$; (C) $x^4 = x^4$ ✓; (D) addition, not a law.
- 13) **Choice C is correct.** (8.EE.2) Area of a square = $s^2 = 9^2 = 81 \text{ cm}^2$.
- 14) **Choice C is correct.** (8.EE.4) Divide: $\frac{2 \times 10^{12}}{4 \times 10^{12}} = \frac{2}{4} \times 10^0 = 0.5 \times 10^0 = 0.5 \text{ kilotons}$.
- 15) **Choice D is correct.** (8.EE.5) A proportional equation has the form $y = kx$ (passes through origin, no constant term). Only $y = -5x$ fits this form.
- 16) **Choice A is correct.** (8.EE.8) Set the expressions equal: $\frac{1}{2}x + 3 = -x + 6$. Multiply by 2: $x + 6 = -2x + 12$, so $3x = 6$, giving $x = 2$. Then $y = \frac{1}{2}(2) + 3 = 4$. Solution: $(2, 4)$.
- 17) **Choice A is correct.** (8.EE.7) Find two numbers that multiply to -8 and add to 2: 4 and -2. So $x^2 + 2x - 8 = (x + 4)(x - 2)$.
- 18) **The correct answer is $\frac{34}{99}$.** (8.NS.1) Set $x = 0.\overline{34}$, so $100x = 34.\overline{34}$. Subtracting: $100x - x = 34$, giving $99x = 34$ and $x = \frac{34}{99}$.
- 19) **Choice A is correct.** (8.F.1) Input 3 appears twice. For the relation to be a function, both ordered pairs with input 3 must have the same output, so the question mark must be 12.
- 20) **The correct answer is A,C.** (8.NS.2) Statement A is true because rational numbers are closed under addition. Statement C is true because any terminating decimal, such as $0.75 = \frac{3}{4}$, is rational. Statement B is false because two irrational numbers can multiply to a rational number, for example $\sqrt{2} \times \sqrt{8} = 4$. Statement D is false because integers are rational. Statement E is false because perfect squares have rational square roots, not irrational ones.
- 21) **Choice B is correct.** (8.F.2) $f(10) = 20 + 1.5(10) = 35$. $g(10) = 25 + 2(10) = 45$. Since $45 > 35$, g is larger at $t = 10$.
- 22) **Choice A is correct.** (8.F.3) First differences: $4 - 0 = 4$, $8 - 4 = 4$, $12 - 8 = 4$. Since x changes by 2 each step, slope = $\frac{4}{2} = 2$.
- 23) **Choice A is correct.** (8.F.4) Slope is $m = \frac{212 - 32}{100 - 0} = \frac{180}{100} = 1.8$. Be careful to use change in F over change in C .
- 24) **Choice B is correct.** (8.F.5) Cost equals price times quantity, which is a linear function with constant slope. A is oscillating, C and D are exponential.
- 25) **Choice D is correct.** (8.G.2) Reflection is a rigid motion that preserves side lengths. The reflected rhombus has sides of 8 cm.



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Hi, Grade 8 Math Star!

◇ You finished this practice set with real effort. Grade 8 math asks you to connect ideas, explain your thinking, and stay steady through multi-step problems. ◇

★ **Remember this:** Every page you completed helped build stronger habits: reading carefully, choosing a method, showing work, and checking whether the answer makes sense. You practiced across 3 full Grade 8 practice tests, and that repeated effort matters. ★

What You Built

- **Focus:** You stayed with challenging questions.
- **Accuracy:** You learned to slow down when details matter.
- **Reasoning:** You practiced explaining why a method works.
- **Readiness:** You are more prepared than when you started.

Grade 8 test-day tip: Before test day, review the questions that made you pause. Those are the best teachers.

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

Jay Daie

Your Grade 8 Math Friend

PRACTICE TODAY, ACHIEVE TOMORROW!

GRADE
8

Give your child the edge they need with **3 full-length** Grade 8 Math practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, boosting confidence, and preparing for success on test day!



WHAT'S INSIDE?



Standards-Aligned Practice

Questions designed to cover essential Grade 8 math standards.



Variety of Question Types

Multiple-choice, short answer, and more to build well-rounded skills.



Real-World Applications

Engaging problems that connect math to everyday life.



Step-by-Step Progress

Track improvement and build confidence with every test.



Build Skills & Boost Confidence

Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

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



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PRACTICE. PREPARE. SUCCEED.



Testinar

More Practice. More Confidence.
Better **Results**.