

MONTANA MAST

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



2

 ONLINE
TESTS

**Standards Aligned
Problem Solving For
Comprehensive Assessment Programs**



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

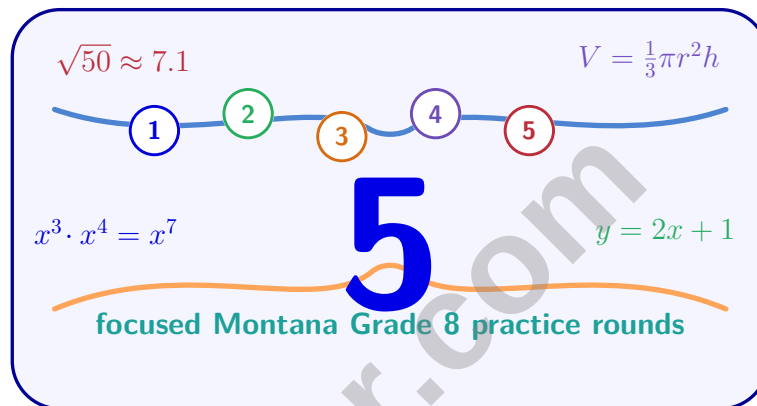


$$a^2 + b^2 = c^2$$



5 Montana MAST Grade 8 Math Practice Tests

Five MAST Tests for Graphs, Transformations, and Data



Five 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!

Five focused rounds for sharper MAST math thinking

This book gives you five 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 five-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?

Five MAST tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	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.

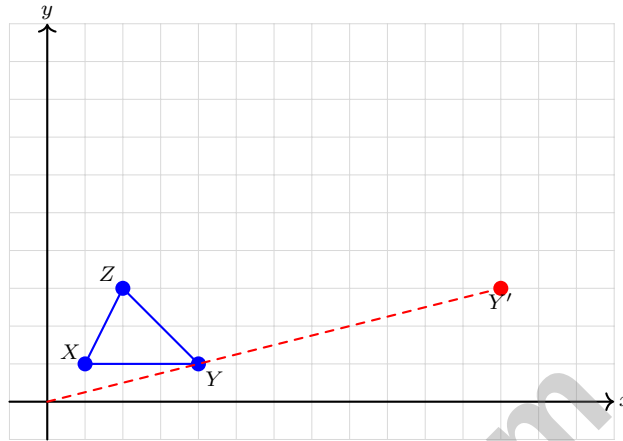


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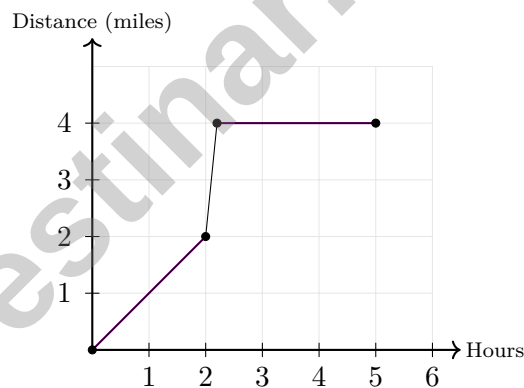
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- 1) Triangle XYZ has vertices at $X(1, 1)$, $Y(4, 1)$, and $Z(2, 3)$. If dilated by scale factor 3 from the origin, where is the vertex that corresponds to Y ?



- ☐ A. $(12, 3)$
☐ C. $(7, 4)$
☐ B. $(4, 1)$
☐ D. $(3, 3)$



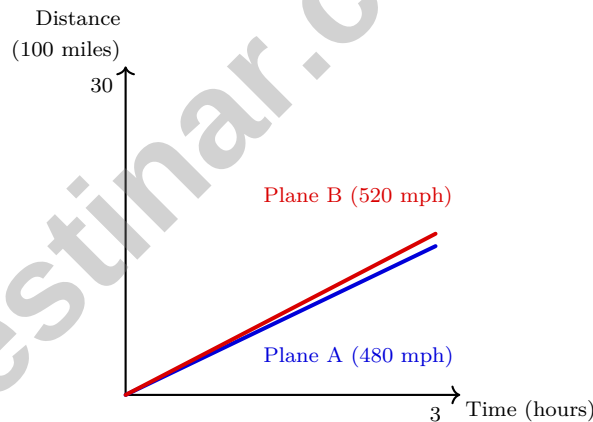
2)

A traveler's distance graph shows: 0 to 2 hours rising, then a jump, then flat. What does the jump represent?

- ☐ A. The traveler rested without moving
☐ B. The traveler waited at the same distance
☐ C. This graph cannot represent a real physical scenario (discontinuity)
☐ D. The traveler went backward in distance



- 3) A point is reflected across the x -axis. If the original point is $(6, 4)$, what are the coordinates of the image?
- ☐ A. $(-6, 4)$ ☐ C. $(-6, -4)$
☐ B. $(6, -4)$ ☐ D. $(4, 6)$
- 4) Which describes a zero slope?
- ☐ A. A horizontal line ☐ C. A diagonal line with positive rate of change
☐ B. A vertical line ☐ D. A line with undefined slope
- 5) Two planes depart from the same airport at the same time, flying in opposite directions. Plane A flies at 480 mph; Plane B flies at 520 mph. The graph shows their positions over time.



After how many hours are the planes 3000 miles apart?

- ☐ A. 2.5 hours ☐ C. 3 hours
☐ B. 3.5 hours ☐ D. 4 hours



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6) Given $f(x) = x^2$ and $g(x) = 2x + 1$, which statement is true?

- ☐ A. $f(3) = g(3)$
☐ C. $f(3) < g(3)$
☐ B. $f(3) > g(3)$
☐ D. Cannot be determined

7) Linear function same y at $x = 2$ and $x = 5$. Slope is?

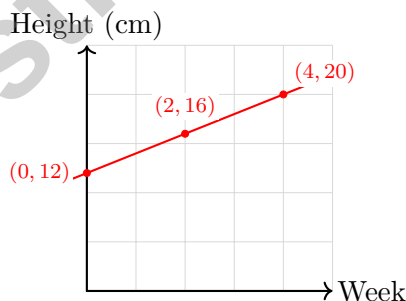
- ☐ A. Positive
 ☐ C. Zero
☐ B. Negative
 ☐ D. Impossible

8) A company's profit P (in dollars) after n years is given by $P = 1000n^2 + 500$. Is this linear or nonlinear?

- ☐ A. Linear; profit increases steadily
 ☐ C. Linear; the equation has two terms
☐ B. Nonlinear; n is squared, creating a parabola
 ☐ D. Nonlinear; profit must eventually decrease

9) A plant grows according to the table:

Week	0	2	4
Height (cm)	12	16	20

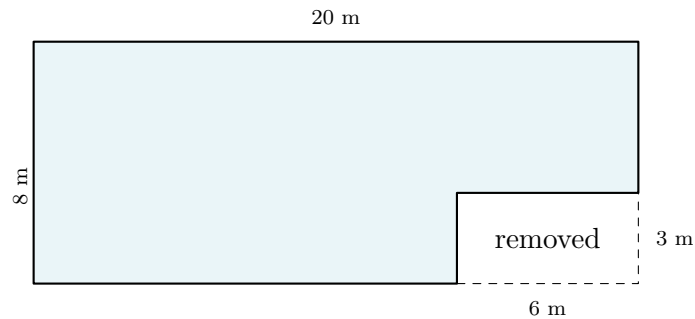


What is the rate of change of the plant's height per week?

- ☐ A. 1 cm/week
 ☐ C. 4 cm/week
☐ B. 2 cm/week
 ☐ D. 12 cm/week



- 1) A shape is composed of a large rectangle (20 m by 8 m) with a smaller rectangle (6 m by 3 m) removed from one corner. Find the remaining area.

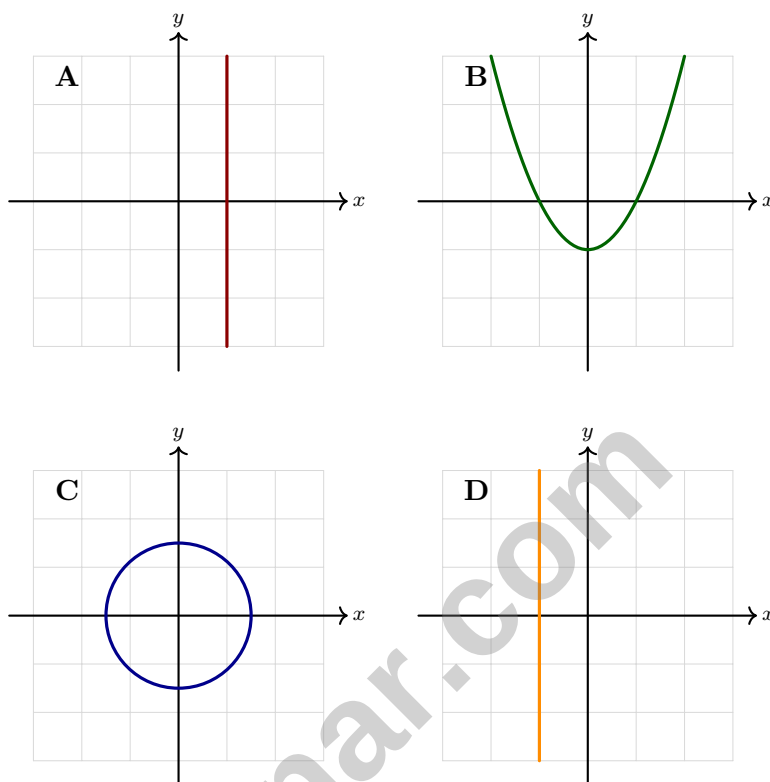


- ☐ A. 142 m^2 ☐ C. 178 m^2
☐ B. 160 m^2 ☐ D. 182 m^2
- 2) Simplify: $\sqrt{36} + \sqrt[3]{8}$



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3) Which graph represents a function?



4) A function has both a zero and an x -intercept at the same point. Which statement is true?

- ☐ A. This is impossible; a zero and x -intercept are different
- ☐ B. They are the same thing; a zero occurs where $f(x) = 0$, which is the x -intercept
- ☐ C. They are related but occur at different points
- ☐ D. Only nonlinear functions can have both



1) Which table represents a function?

Table A:

x	1	2	2	3
y	4	5	6	7

Table B:

x	1	2	3	4
y	2	4	6	8

- ☐ A. Table A, because it has more inputs.
☐ B. Table B, because each input has exactly one output.
☐ C. Both tables are functions.
☐ D. Neither table is a function.
- 2) A freelancer's gross income is \$5,000/month. After federal tax (15%), state tax (5%), and self-employment tax (15%), what is the net income?

Gross Income \$5,000
Total Taxes 35%
Net Income ?

- ☐ A. \$4,250
☐ B. \$3,500
☐ C. \$4,000
☐ D. \$3,250
- 3) Match the expression to the exponent law it uses:

Expression	Law
$x^5 \cdot x^3 = x^8$	Product rule (add)

Which expression uses the quotient rule?

- ☐ A. $a^2 \cdot a^4 = a^6$
☐ B. $(y^2)^5 = y^{10}$
☐ C. $(2b)^3 = 8b^3$
☐ D. $\frac{m^9}{m^3} = m^6$



4) What is $\sqrt{169}$?

☐ A. 12

☐ C. 14

☐ B. 15

☐ D. 13

5) A square has vertices at $(0, 0)$, $(2, 0)$, $(2, 2)$, and $(0, 2)$. It is translated by the vector $(5, -3)$. What are the new coordinates of the vertex that was originally at $(2, 2)$?

6) Which pair has the same value?

☐ A. 5.0×10^3 and 0.5×10^4

☐ C. 3.2×10^{-2} and 0.32×10^{-1}

☐ B. 4.5×10^2 and 4.5×10^{-2}

☐ D. 3.3×10^4 and 3.3×10^{-4}

7) Multiply: $(6 \times 10^2) \times (3 \times 10^4)$

☐ A. 18×10^5

☐ C. 9×10^6

☐ B. 18×10^8

☐ D. 1.8×10^7



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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 A is correct.** (8.G.4) Apply dilation: $(x, y) \rightarrow (kx, ky)$ where $k = 3$. Point $Y(4, 1) \rightarrow Y'(4 \times 3, 1 \times 3) = (12, 3)$.
- 2) **Choice C is correct.** (8.F.5) A jump discontinuity in a distance-time graph would mean the distance changes suddenly without showing the travel in between, which is not physically realistic for normal motion. A real distance-time graph should change continuously.
- 3) **Choice B is correct.** (8.G.3) Reflection across the x -axis negates the y -coordinate: $(x, y) \rightarrow (x, -y)$. So $(6, 4) \rightarrow (6, -4)$.
- 4) **Choice A is correct.** (8.EE.8) Zero slope means $\Delta y = 0$, so the line is perfectly horizontal (no vertical change). A vertical line has undefined slope.
- 5) **Choice C is correct.** (8.EE.7) When flying in opposite directions, combined speed = $480 + 520 = 1000$ mph. Distance = speed $\times$ time: $3000 = 1000t$, so $t = 3$ hours.
- 6) **Choice B is correct.** (8.F.1) $f(3) = 3^2 = 9$ and $g(3) = 2(3) + 1 = 7$. Since $9 > 7$, we have $f(3) > g(3)$.
- 7) **Choice C is correct.** (8.F.2) If $f(2) = f(5)$, slope = $(f(5) - f(2))/(5 - 2) = 0/3 = 0$. Horizontal line.
- 8) **Choice B is correct.** (8.F.3) The term n^2 makes this a quadratic function (nonlinear). Linear functions have only the first power of the variable.
- 9) **Choice B is correct.** (8.F.4) Slope: $\frac{16-12}{2-0} = \frac{4}{2} = 2$ cm/week. (Or: from week 0 to 4, height goes from 12 to 20, a change of 8 cm in 4 weeks = 2 cm/week.)
- 10) **The correct answer is 4.** (8.EE.5) The constant is $k = 12 \div 3 = 4$.
- 11) **Choice B is correct.** (8.G.2) Congruent trapezoids have equal heights. Since Trapezoid 1 has a height of 4 inches and Trapezoid 2 is congruent, Trapezoid 2 also has a height of 4 inches.
- 12) **Choice D is correct.** (8.G.5) Exterior angle equals the sum of remote interior angles: $55 + 64 = 119^\circ$.
- 13) **Choice A is correct.** (8.G.8) $d = \sqrt{(8-2)^2 + (13-5)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
- 14) **Choice A is correct.** (8.G.7) Let the smaller angle be x . Then $3x + x = 90$, so $4x = 90$ and $x = 22.5^\circ$.
- 15) **Choice B is correct.** (8.G.9) $V_X = \frac{1}{3} \times 9 \times 10 = 30 \text{ cm}^3$. $V_Y = \frac{1}{3} \times 36 \times 10 = 120 \text{ cm}^3$. Ratio: $\frac{30}{120} = 1 : 4$.
- 16) **Choice D is correct.** (8.G.5) The sum of interior angles of an n -gon is $(n-2) \times 180^\circ$. For a hexagon, $(6-2) \times 180 = 720^\circ$.
- 17) **Choice C is correct.** (8.SP.1) When most points cluster tightly around an imaginary upward line with few outliers far from it, the correlation is strong. Wide scatter indicates weak correlation.
- 18) **Choice C is correct.** (8.SP.4) Relative frequency of streaming among broadband users: $\frac{126}{168} = 0.75$.
- 19) **Choice A is correct.** (8.G.8) Smaller MAD (1.5) indicates more consistent performance near the mean. Player A's scores vary less, making him more predictably reliable.
- 20) **The correct answer is no solution.** (8.EE.8) The two equations represent lines with the same slope $\frac{1}{2}$ but different y -intercepts (1 and 4), making them parallel. Parallel lines never intersect, so the system has no solution.
- 21) **The correct answer is A,B.** (8.EE.4) Division rule: divide coefficients ($6.4 \div 1.6 = 4$, choice A) and subtract exponents ($-3 - (-5) = 2$, choice B). This gives 4×10^2 . Choice C is wrong, choice D incorrectly adds exponents, and choice E has the wrong exponent sign.
- 22) **Choice D is correct.** (8.G.7) $5 \times 4 \times 3 = 60$ different combinations.
- 23) **Choice A is correct.** (8.G.6, 8.G.7) The diagonal is the hypotenuse of a right triangle with legs 8 and 6: $d^2 = 8^2 + 6^2 = 64 + 36 = 100$, so $d = 10$ m.
- 24) **Choice A is correct.** (8.G.7) Square area = $8 \times 8 = 64 \text{ m}^2$. Each triangle area = $\frac{1}{2} \times 4 \times 2 = 4 \text{ m}^2$. Two triangles = 8 m^2 . Remaining = $64 - 8 = 56 \text{ m}^2$.
- 25) **Choice A is correct.** (8.SP.2) The slope represents the rate of change. A slope of 8 means for every 1-unit increase in x , y increases by 8 units.
- 26) **Choice B is correct.** (8.NS.2) A counterexample must contain a 3 and still be rational. The decimal $0.3 = \frac{3}{10}$ does exactly that, so it disproves the claim. Choices A and C are irrational, and choice D is non-terminating and non-repeating, so it is also irrational.
- 27) **Choice B is correct.** (8.NS.2) Two location choices times three time options: $2 \times 3 = 6$ possible arrangements.



Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 5 full Grade 8 practice tests, and that repeated effort matters. ★

Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

Grade 8 test-day tip: When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

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

Jay Daie

Your Persistence Coach

Practice Today. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 full-length Grade 8 Math** practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, strengthening problem-solving abilities, and achieving 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.

COVERS ALL ESSENTIAL TOPICS

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

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