

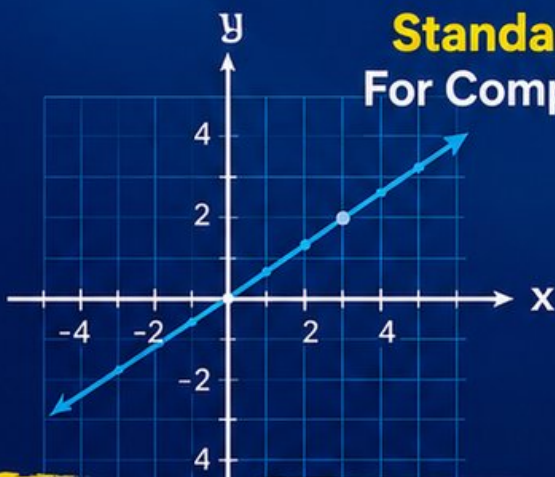
9

Montana
MAST

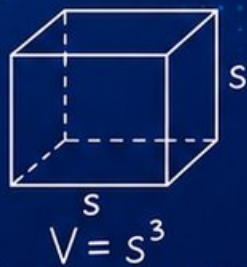
Grade 8

MATH

PRACTICE TESTS

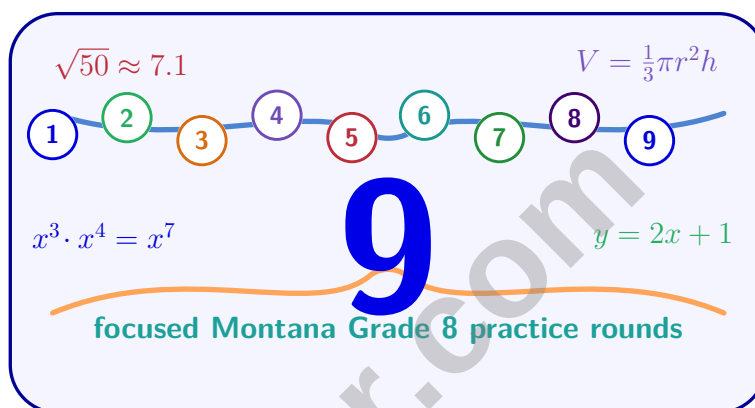
Standards Aligned Problem Solving
For Comprehensive Assessment Programs

$$2x + 3y = 12$$
$$y = mx + b$$

9 PRINTED
TESTS2 ONLINE
TESTSUse these **two additional online practice tests** for extra review after the printed tests in this book.

9 Montana MAST Grade 8 Math Practice Tests

Complete Montana Practice for Functions, Systems, Geometry, Data, and Probability



Nine 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!

Nine focused rounds for sharper MAST math thinking

This book gives you nine 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 nine-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?

Nine MAST tests, 360 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real and irrational numbers, integer exponents, scientific notation, equations, and careful reading.
Tests 4–6	Slope, systems of equations, functions, inequalities, transformations, congruence, and similarity.
Tests 7–9	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
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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1) Which inequality is equivalent to $-\frac{x}{4} < 2$?

☐ A. $x < -8$

☐ C. $x > -8$

☐ B. $x < 8$

☐ D. $x > 8$

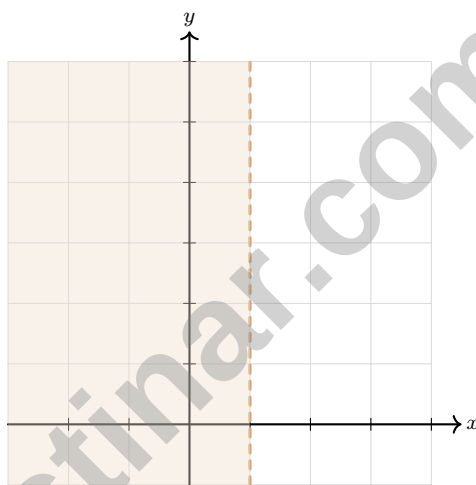
2) A figure is first rotated 90° counterclockwise about the origin, then translated 3 units right. Which rule describes the image of the point (x, y) after both transformations?

☐ A. $(x, y) \rightarrow (-y + 3, x)$

☐ C. $(x, y) \rightarrow (x + 3, -y)$

☐ B. $(x, y) \rightarrow (-y, x + 3)$

☐ D. $(x, y) \rightarrow (-y - 3, x)$



3)

The graph shows which inequality?

☐ A. $x < 1$

☐ C. $x \leq 1$

☐ B. $x > 1$

☐ D. $x \geq 1$



4) A cube has an edge length of 4 units. What is its volume?

☐ A. 16 cubic units

☐ C. 48 cubic units

☐ B. 24 cubic units

☐ D. 64 cubic units

5) If 6 pounds of almonds cost \$30, what is the constant of proportionality (unit price)?

☐ A. \$4 per pound

☐ C. \$6 per pound

☐ B. \$8 per pound

☐ D. \$5 per pound

6) A line passes through (0, 7) and (3, 1). What is the slope?

☐ A. 2

☐ C. 3

☐ B. -3

☐ D. -2

7) Solve for y : $-4y + 7 = 15$

☐ A. $y = -8$

☐ C. $y = 2$

☐ B. $y = 8$

☐ D. $y = -2$

8) Solve by substitution: $\begin{cases} y = 2x - 5 \\ 4x - y = 7 \end{cases}$

☐ A. (1, -3)

☐ C. (3, 1)

☐ B. (2, -1)

☐ D. (4, 3)

9) Factor $x^2 - 13x + 42$.

☐ A. $(x - 6)(x - 7)$

☐ C. $(x - 21)(x - 2)$

☐ B. $(x - 14)(x + 1)$

☐ D. $(x - 3)(x - 14)$



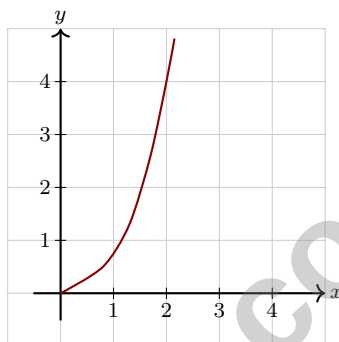
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10) Which statement best defines a function?

- ☐ A. A relation where every output has exactly one input.
- ☐ B. A relation where every input has exactly one output.
- ☐ C. A set of ordered pairs with different x -coordinates.
- ☐ D. Any relation that includes both positive and negative values.

11) Which graph represents a NONLINEAR function?



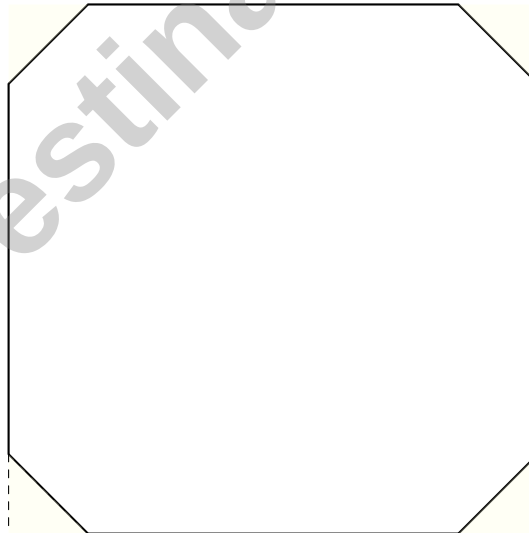
- ☐ A. Yes, the curve is parabolic
- ☐ B. No, it starts at the origin
- ☐ C. Yes, it only has positive y -values
- ☐ D. No, the points are integers



- 1) A table shows that when $x = 1$, $y = 7$ and when $x = 5$, $y = 23$. What is the slope?

x	1	5
y	7	23

- ☐ A. 4
- ☐ B. 8
- ☐ C. $\frac{1}{4}$
- ☐ D. 16
- 2) In a study of 420 students and their study habits, 252 use study groups and 168 study alone. Of those using study groups, 189 report higher grades. What is the relative frequency of higher-grade students among study-group users?
- ☐ A. 0.45
- ☐ B. 0.60
- ☐ C. 0.75
- ☐ D. 0.85
- 3) An art installation is a regular octagon formed by cutting isosceles right triangles from each corner of a 20 m by 20 m square (each cut triangle has legs 3 m). What is the area of the octagon?

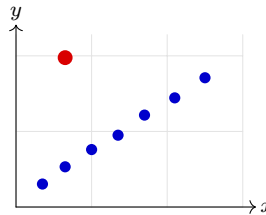


- ☐ A. 282 m^2
- ☐ B. 382 m^2
- ☐ C. 342 m^2
- ☐ D. 400 m^2



- 4) A square pyramid has a base with side 8 cm. If the volume is 192 cm^3 , what is the height?

- ☐ A. 6 cm ☐ C. 12 cm
☐ B. 9 cm ☐ D. 18 cm



5)

In a scatter plot, an **outlier** is best defined as:

- ☐ A. A data point that lies far from the general pattern or trend of the data ☐ C. The point with the largest x-value
☐ B. Any point that does not fall exactly on a perfect line ☐ D. The point with the smallest y-value
- 6) Four angles are formed at the intersection of two lines. If one angle measures b° , which expression represents the sum of the measures of the other three angles?
- ☐ A. b ☐ C. $360 - b$
☐ B. $180 - b$ ☐ D. $540 - b$
- 7) A student calculates the probability of rolling a 3 on a die as $\frac{1}{3}$. Which statement best corrects the mistake?

- ☐ A. The student forgot to consider all outcomes. ☐ C. The student counted too many favorable outcomes.
☐ B. The probability is actually $\frac{4}{6}$, not $\frac{1}{3}$. ☐ D. The probability is actually $\frac{1}{6}$, not $\frac{1}{3}$.



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1) Solve for x : $\frac{2x}{3} = 8$

☐ A. $x = 12$

☐ C. $x = 24$

☐ B. $x = 16$

☐ D. $x = 6$

2) A student calculates the surface area of a rectangular prism with dimensions 4 m $\times$ 3 m $\times$ 2 m as $SA = 4 \times 3 + 4 \times 2 + 3 \times 2 = 12 + 8 + 6 = 26 \text{ m}^2$. What is the student's error?

☐ A. Forgot to multiply by 2

☐ D. Added instead of multiplied all terms

☐ B. Calculated volume instead

☐ C. Used the wrong formula

3) A student found that a cone and a cylinder with the same radius r and height h have volumes differing by 600 cm^3 . If $V_{\text{cyl}} = 900 \text{ cm}^3$, what is V_{cone} ?

☐ A. 100 cm^3

☐ C. 600 cm^3

☐ B. 300 cm^3

☐ D. 1500 cm^3

4) A bank loan of \$10,000 at 5% simple interest is repaid in 5 equal annual installments. The total simple interest over the full term is \$2,500. How much principal and interest remains owed after making the first \$2,500 payment?

☐ A. \$8,000

☐ C. \$10,000

☐ B. \$8,500

☐ D. \$9,500

5) Solve the system $\begin{cases} x + y = 8 \\ x - y = 2 \end{cases}$ by elimination.



6) Runner P : $d(t) = 8t$ mph. Runner Q at $t = 0$: 2 mi, $t = 3$: 27 mi. Faster?

☐ A. Runner P

☐ C. Both same.

☐ B. Runner Q

☐ D. Cannot be determined.

7) The equation $y = |x - 2|$ is:

☐ A. Linear, because it is an equation

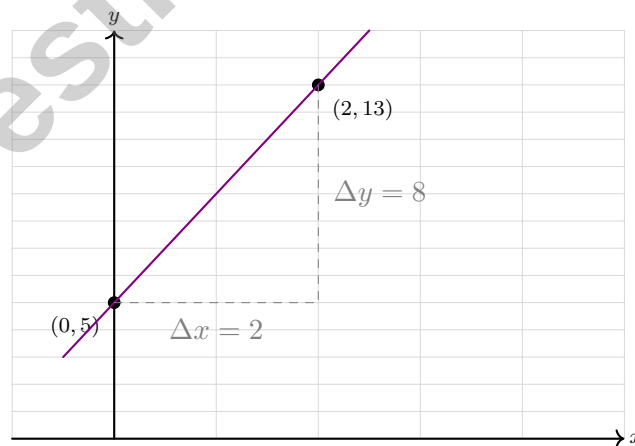
☐ C. Nonlinear, because absolute value creates a V-shape

☐ B. Linear, because the absolute value of a linear expression is linear

☐ D. Linear, because it can be written as $y = mx + b$

8) Evaluate $(x + 9)^2$ when $x = 1$.

9) A graph shows a line passing through $(0, 5)$ and $(2, 13)$. What is the equation of the line?



☐ A. $y = 4x + 5$

☐ C. $y = 8x + 5$

☐ B. $y = 2x + 5$

☐ D. $y = 4x + 13$



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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 C is correct.** **(8.EE.7)** Multiply by -4 (FLIP): $x > -8$.
- 2) **Choice A is correct.** **(8.G.1)** Step 1: Rotate 90° CCW: $(x, y) \rightarrow (-y, x)$. Step 2: Translate 3 units right (add 3 to x-coordinate): $(-y, x) \rightarrow (-y + 3, x)$.
- 3) **Choice A is correct.** **(8.G.8)** Dashed vertical line at $x = 1$ with shading to the LEFT means $x < 1$.
- 4) **Choice D is correct.** **(8.EE.2)** Volume of a cube $= e^3 = 4^3 = 64$ cubic units.
- 5) **Choice D is correct.** **(8.EE.5)** Unit price $k = \frac{30}{6} = 5$ dollars per pound.
- 6) **Choice D is correct.** **(8.EE.6)** Slope $= \frac{1-7}{3-0} = \frac{-6}{3} = -2$.
- 7) **Choice D is correct.** **(8.EE.7)** Subtract 7: $-4y = 8$. Divide by -4 : $y = -2$.
- 8) **Choice A is correct.** **(8.EE.8)** Substitute $y = 2x - 5$ into $4x - y = 7$: $4x - (2x - 5) = 7$, so $2x + 5 = 7$ and $x = 1$. Then $y = 2(1) - 5 = -3$, so the solution is $(1, -3)$.
- 9) **Choice A is correct.** **(8.EE.7)** Find two numbers that multiply to 42 and add to -13 : -6 and -7 . Verify: $(-6)(-7) = 42$ and $-6 - 7 = -13$.
- 10) **Choice B is correct.** **(8.F.1)** The definition of a function requires that for each input value, there is exactly one corresponding output value. This ensures consistency and predictability.
- 11) **Choice A is correct.** **(8.F.3)** A nonlinear function does not form a straight line. This graph shows a parabola (curved shape), characteristic of a quadratic or nonlinear function.
- 12) **Choice B is correct.** **(8.F.5)** The graph shows a flat horizontal line from week 3 to week 5 at 4 mph, indicating no change in speed. This is the maintenance phase after rapid early gains.
- 13) **Choice A is correct.** **(8.G.8)** Map distance is $\sqrt{100} = 10$ units. Actual distance is $10 \times 5 = 50$ miles.
- 14) **The correct answer is $\frac{1}{2}$.** **(8.SP.4)** Among juniors: $\frac{100}{100+100} = \frac{100}{200} = \frac{1}{2} = 0.5$.
- 15) **Choice D is correct.** **(8.G.7)** Option 1: $I = 800 \times 0.10 \times 1 = \80 . Option 2: $\$0$ interest. Difference: $\$80 - \$0 = \$80$.
- 16) **The correct answer is 12.** **(8.NS.2)** Since $12 \times 12 = 144$, $\sqrt{144} = 12$.
- 17) **Choice D is correct.** **(8.EE.1)** $(k^2)^3 = k^6$; then $k^6 \cdot k^{-1} = k^5$; then $\frac{k^5}{k^5} = k^0 = 1$.
- 18) **Choice D is correct.** **(8.EE.4)** Divide coefficients: $8 \div 2 = 4$. Subtract exponents: $10^{8-3} = 10^5$. Result: 4×10^5 .
- 19) **Choice B is correct.** **(8.F.2)** First base cost: $\$5$. Second base cost: $\$7$. Since $7 > 5$, second is higher.
- 20) **Choice B is correct.** **(8.F.4)** Initial height is 60 inches (intercept). Melts (decreases) at 4 inches per day (negative slope). Equation: $h = -4d + 60$.
- 21) **Choice C is correct.** **(8.G.3)** Under 180° rotation, $(x, y) \rightarrow (-x, -y)$: $(1, 1) \rightarrow (-1, -1)$, $(3, 1) \rightarrow (-3, -1)$, $(2, 3) \rightarrow (-2, -3)$. This matches the red triangle.
- 22) **The correct answer is B,E.** **(8.NS.2)** $\sqrt{64} = 8$ (rational), $\sqrt{49} = 7$ (rational), and $\frac{1}{2}$ (rational) are all rational. $\sqrt{27} = 3\sqrt{3}$ is irrational (irrational number times integer). $\pi - 2$ is irrational (irrational minus rational).
- 23) **Choice C is correct.** **(8.G.5)** In an equilateral triangle, all three angles are equal. Since they sum to 180° , each angle is $180 \div 3 = 60^\circ$.
- 24) **Choice B is correct.** **(8.G.6, 8.G.7)** The student is confusing the Pythagorean Theorem with multiplication. For legs 3 and 4: $3 \times 4 = 12$ is incorrect, but $\sqrt{3^2 + 4^2} = \sqrt{25} = 5$ is correct.
- 25) **Choice B is correct.** **(8.G.5)** The sum of interior angles in a quadrilateral is 360° . So $D = 360 - 85 - 95 - 100 = 80^\circ$.
- 26) **Choice B is correct.** **(8.G.8)** MAD measures average distance from the mean. Deviations: $|0 - 2| = 2$, $|1 - 2| = 1$ (twice), $|2 - 2| = 0$, $|6 - 2| = 4$. Sum = 8. MAD $= 8/5 = 1.6$, showing typical spread.
- 27) **Choice A is correct.** **(8.EE.8)** The line passes through $(0, 50)$ and $(8, 10)$. Slope $= \frac{10 - 50}{8 - 0} = \frac{-40}{8} = -5$ mg/h. The concentration decreases at a rate of 5 mg per hour.



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Hi, Math Hero!

◇ This high-stamina book gave you nine substantial Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. You showed up for Grade 8 practice again and again. That is what real growth looks like: steady effort, honest review, and a willingness to try. ◇

★ **Remember this:** A math hero is not someone who never misses a question. A math hero learns from the miss and comes back stronger. ★

Hero Habits

- **Courage:** You try problems that are not automatic.
- **Honesty:** You review what needs work.
- **Patience:** You let skills grow over time.
- **Pride:** You recognize the effort you gave.

Grade 8 test-day tip: Save one solved problem you are proud of. Looking back at progress helps motivation stay strong.

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

Jay Daie

Your Math Hero Guide

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

Help your child excel in math with **9 full-length Grade 8 practice tests** designed to reflect real test formats and cover all key math standards.

With a wide variety of questions and real-world applications, this book builds the skills and confidence students need to achieve their best!



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 | ✓ 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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