

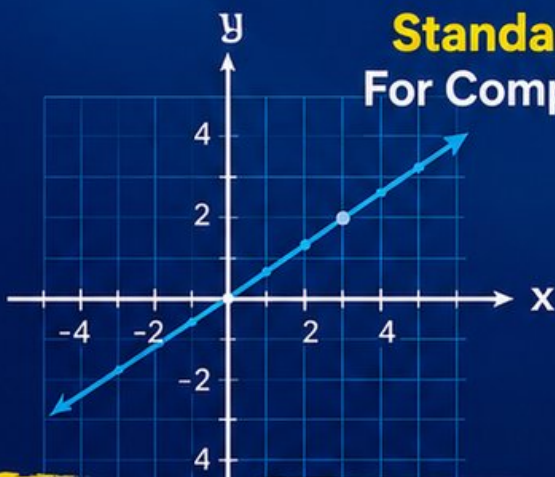
9

Michigan
M STEP

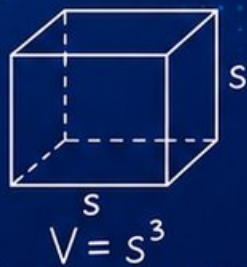
Grade 8

MATH

PRACTICE TESTS

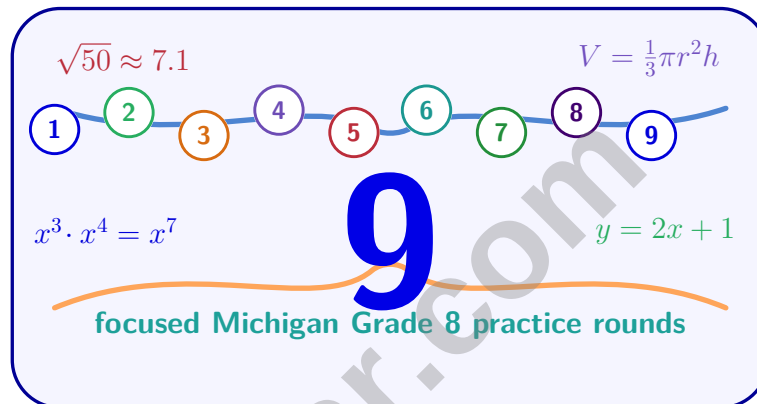
Standards Aligned Problem Solving
For Comprehensive Assessment Programs

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

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

9 Michigan M STEP Grade 8 Math Practice Tests

Grade 8 Michigan Practice for Graphs, Equations, Transformations, and Data Analysis



Nine complete 40-question Grade 8 M STEP 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, Michigan Grade 8 Problem Solver!

Nine focused rounds for sharper M STEP math thinking

This book gives you nine full Grade 8 M STEP 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 Michigan 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.

Michigan 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 M STEP 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) A horizontal line passes through the point $(2, 5)$. What is the equation of this line?

☐ A. $x = 2$

☐ C. $y = 2x + 5$

☐ B. $x = y$

☐ D. $y = 5$

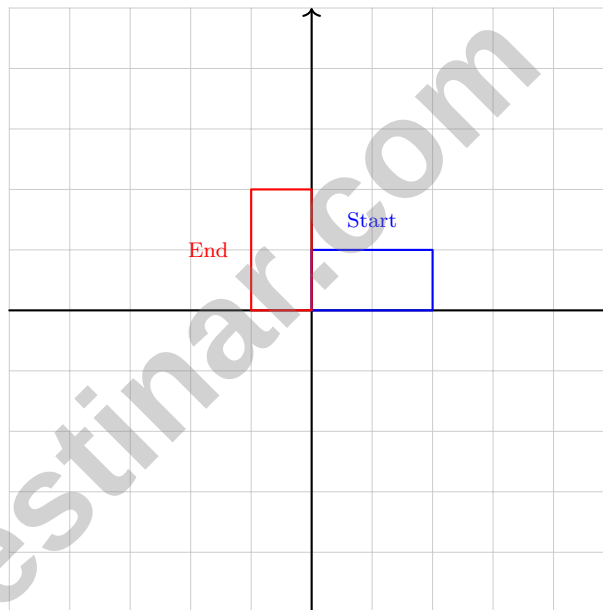
2) A rent-to-own contract charges \$600/month for 36 months on furniture worth \$12,000 cash. What is the finance charge?

☐ A. \$2,400

☐ C. \$9,600

☐ B. \$6,000

☐ D. \$21,600



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

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4) Solve: $-3(x - 2) \leq 9$

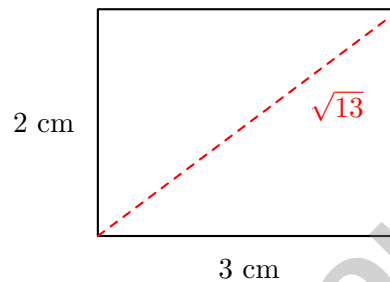
☐ A. $x \leq -1$

☐ C. $x \geq -1$

☐ B. $x \leq 1$

☐ D. $x \geq 1$

5) A rectangle has dimensions 2 cm by 3 cm. The diagonal is $\sqrt{13}$ cm. What is the best estimate of the diagonal?



☐ A. 3.0 cm

☐ C. 4.2 cm

☐ B. 6.5 cm

☐ D. 3.6 cm

6) Which expression equals 2^{10} ?

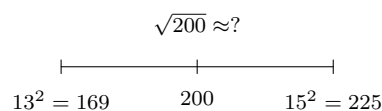
☐ A. $2^5 + 2^5$

☐ C. $(2^5)^2$

☐ B. $2^6 + 2^4$

☐ D. $2^{15} \div 2^6$

7) Which is a reasonable approximation for $\sqrt{200}$?



☐ A. 12

☐ C. 16

☐ B. 18

☐ D. 14



8) Solve for x : $-2x + 8 = 0$

☐ A. $x = -4$

☐ C. $x = 4$

☐ B. $x = 6$

☐ D. $x = 8$

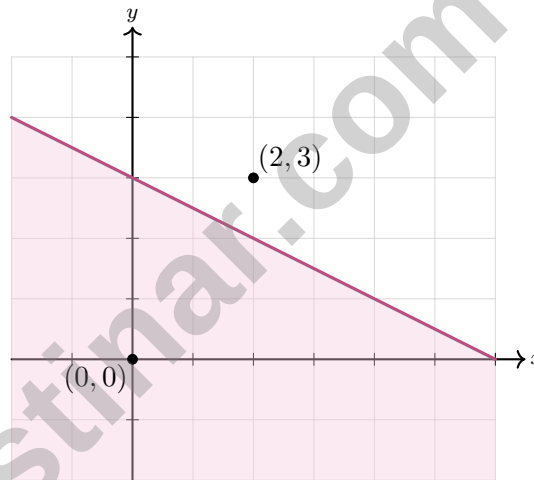
9) Use elimination to solve:
$$\begin{cases} 3x + 4y = 10 \\ 3x - 2y = 4 \end{cases}$$

☐ A. $(1, \frac{7}{4})$

☐ C. $(0, \frac{5}{2})$

☐ B. $(3, \frac{1}{4})$

☐ D. $(2, 1)$



10)

The graph has a solid line with shading below. Two points are marked: $(0, 0)$ (in shaded region) and $(2, 3)$ (above the line). Which inequality is graphed?

☐ A. $y < -\frac{1}{2}x + 3$ (forgot to flip when dividing by $-\frac{1}{2}$)

☐ C. $y \leq -\frac{1}{2}x + 3$ (correct)

☐ B. $y \geq -\frac{1}{2}x + 3$ (reversed shading AND boundary inclusion)

☐ D. $y > -\frac{1}{2}x + 3$ (solid line with shading above)



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1) Factor completely: $4x^2 + 16x + 16$.

☐ A. $4(x + 2)^2$

☐ C. $(2x + 2)^2$

☐ B. $4(x^2 + 4x + 4)$

☐ D. $4(x + 4)^2$

2) A student has 6 different books and wants to arrange all of them on a shelf. How many arrangements are possible?

☐ A. $6 + 5 + 4 + 3 + 2 + 1 = 21$

☐ C. $6! = 720$

☐ B. $6^6 = 46,656$

☐ D. $\binom{6}{6} = 1$

3) A museum's skylight is a square pyramid frame with a base side of 5 m and height 3 m. What is the volume of air enclosed by this pyramidal structure?

☐ A. 15 m^3

☐ C. 75 m^3

☐ B. 25 m^3

☐ D. 225 m^3

4) A student uses the model $G = 0.5a + 60$ to predict grades based on assignment score a . The model predicts a grade of 85, but the student actually earns 82. Which statement is correct?

☐ A. The residual is 3 (model overestimated)☐ C. The residual is 0 (perfect prediction)☐ B. The residual is -3 (model overestimated)☐ D. The model has a slope error

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- 5) Use the table below. What is the relative frequency of remote workers among HR employees?

	Remote	On-Site	Total
IT	105	75	180
HR	35	85	120
Ops	60	140	200
Total	200	300	500

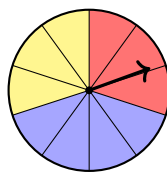
- ☐ A. $\frac{35}{200} \approx 0.18$
☐ C. $\frac{35}{120} \approx 0.29$
- ☐ B. $\frac{35}{500} = 0.07$
☐ D. $\frac{35}{85} \approx 0.41$

6)

Dataset	Mean	MAD
Set A	50	3
Set B	50	9

Which interpretation correctly compares the two data sets?

- ☐ A. Set A has three times fewer values than Set B
 ☐ C. Set A and Set B have the same spread
- ☐ B. Set B's values are less predictable
 ☐ D. Set B has a higher mean
- 7) A spinner has 10 equal sections: 3 red, 4 blue, and 3 yellow. What is the probability of landing on red OR blue?



3 red, 4 blue, 3 yellow

- ☐ A. $\frac{4}{10}$
☐ C. $\frac{7}{10}$
- ☐ B. $\frac{12}{10}$
☐ D. $\frac{3}{10}$



- 1) A store notices that for every 2 customers who enter, 1 item is sold. What is the slope of items sold versus customers?

☐ A. 2

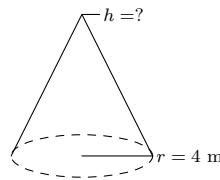
☐ C. 3

☐ B. $-\frac{1}{2}$
☐ D. $\frac{1}{2}$

- 2) A triangular prism has an isosceles triangular base with base 8 cm and two equal sides of 5 cm each. The height of the triangle is 3 cm. The prism length is 6 cm. What is the total surface area?

☐ A. 96 cm^2
☐ C. 132 cm^2
☐ B. 108 cm^2
☐ D. 156 cm^2

- 3) Solve the system $\begin{cases} y = 2x \\ x + y = 9 \end{cases}$ by substitution.



4)

A cone has a base radius of 4 m and volume of 201.06 m^3 . What is its height? (Use $\pi \approx 3.14$.)

☐ A. 12 m

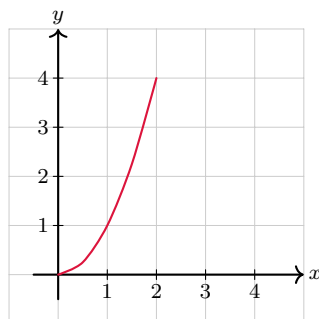
☐ C. 18 m

☐ B. 15 m

☐ D. 24 m


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5) The graph below curves upward. Is it linear?



- ☐ A. Yes, because x and y are both positive
- ☐ B. No, the curve is not a straight line
- ☐ C. Yes, the function is always increasing
- ☐ D. No, only because it starts at the origin
- 6) A fitness gym charges only a flat \$50 monthly fee with no additional per-visit costs. If C is total monthly cost and m is the number of months, which equation represents this?
- ☐ A. $C = m + 50$
- ☐ B. $C = 50m$
- ☐ C. $C = 50$
- ☐ D. $C = m^2$
- 7) If point P is translated by $(x, y) \rightarrow (x - 6, y + 4)$, and $P' = (1, 8)$ is the image, what are the coordinates of the original point P ?
- ☐ A. $(7, 4)$
- ☐ B. $(-5, 4)$
- ☐ C. $(7, 12)$
- ☐ D. $(-5, 12)$



Michigan M STEP 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 Michigan M STEP practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.EE.B.6) A horizontal line has slope 0 and is represented by $y = c$ where c is constant. Here, $c = 5$.
- 2) **Choice C is correct.** (8.G.B.7) Total paid: $600 \times 36 = \$21,600$. Finance charge: $21600 - 12000 = \$9,600$.
- 3) **Choice C is correct.** (8.G.A.1) Using $(x, y) \rightarrow (-y, x)$: $(2, 0) \rightarrow (0, 2)$, $(2, 1) \rightarrow (-1, 2)$, matching the End figure.
- 4) **Choice C is correct.** (8.EE.C.8b) Distribute: $-3x + 6 \leq 9$. Subtract 6: $-3x \leq 3$. Divide by -3 and flip the inequality: $x \geq -1$.
- 5) **Choice D is correct.** (8.NS.A.2) By the Pythagorean theorem, diagonal $= \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13} \approx 3.606 \approx 3.6$ cm.
- 6) **Choice C is correct.** (8.EE.A.1) $(2^5)^2 = 2^{5 \cdot 2} = 2^{10}$. The other choices do not simplify to 2^{10} .
- 7) **Choice D is correct.** (8.EE.A.2) $\sqrt{200} = \sqrt{100 \times 2} = 10\sqrt{2} \approx 10 \times 1.41 = 14.1$. So 14 is the closest integer.
- 8) **Choice C is correct.** (8.EE.C.7) Subtract 8: $-2x = -8$. Divide by -2 : $x = 4$.
- 9) **Choice D is correct.** (8.EE.C.8a) Subtract the second from the first: $(3x + 4y) - (3x - 2y) = 10 - 4$, so $6y = 6$, giving $y = 1$. Substitute: $3x + 4(1) = 10$, so $x = 2$. Solution: $(2, 1)$.
- 10) **Choice C is correct.** (8.EE.C.8b) SOLID boundary (includes line) + BELOW shading $= \leq$. Verify: $(0, 0)$ in shaded region: $0 \leq -\frac{1}{2}(0) + 3 = 3$ ✓ TRUE. Distractor A shows algebra error (forgot flip); B shows double error; D shows inverted shading.
- 11) **Choice A is correct.** (8.F.A.2) $A(4) = 2(4) = 8$. $B(4) = 1(4) - 3 = 1$. Since $8 > 1$, Line A is higher.
- 12) **Choice B is correct.** (8.F.A.3) Constant second differences indicate a quadratic (degree-2 polynomial) function, which is nonlinear.
- 13) **Choice B is correct.** (8.G.A.3) When dilated by scale factor k , area is multiplied by k^2 . Here: $10 \times 3^2 = 10 \times 9 = 90$.
- 14) **Choice B is correct.** (8.G.B.8) This forms a 3-4-5 right triangle. The hypotenuse (ladder length) is $\sqrt{3^2 + 4^2} = \sqrt{9 + 16} = 5$ feet.
- 15) **Choice D is correct.** (8.EE.A.4) Rewrite with common exponent: $5.8 \times 10^6 - 0.23 \times 10^6 = (5.8 - 0.23) \times 10^6 = 5.57 \times 10^6$.
- 16) **The correct answer is 210.** (8.EE.C.7b) First digit: 7 choices. Second digit: 6 remaining. Third digit: 5 remaining. Total: $7 \times 6 \times 5 = 210$.
- 17) **Choice C is correct.** (8.EE.B.5) $k = \frac{10}{1} = 10$. The line is very steep, passing through $(0, 0)$ and $(1, 10)$.
- 18) **Choice C is correct.** (8.EE.C.7) FOIL: $(2x + 1)(x + 3) = 2x^2 + 6x + x + 3 = 2x^2 + 7x + 3$.
- 19) **Choice C is correct.** (8.F.A.1) The definition of a function only requires that each input has exactly one output. Different inputs can produce different outputs, and some functions are constant while others are not.
- 20) **The correct answer is 0.00047.** (8.EE.A.3) Move the decimal 4 places to the left: $4.7 \times 10^{-4} = 0.00047$.
- 21) **The correct answer is A, B.** (8.G.B.6, 8.G.B.7) A: $3^2 + 4^2 = 9 + 16 = 25 = 5^2$ ✓. B: $5^2 + 12^2 = 25 + 144 = 169 = 13^2$ ✓. C: $36 + 49 = 85 \neq 64$. D: $49 + 576 = 625 \neq 676$. E: $64 + 100 = 164 \neq 144$.
- 22) **Choice B is correct.** (8.F.B.4) In $h = mt + b$, the slope $m = 2$ represents the rate of change: 2 cm per week. The number 15 is the initial height (intercept).
- 23) **Choice B is correct.** (8.F.B.5) The constant segments at $y = 2$ and $y = 5$ stay below and above $y = 4$. The increasing segment must cross $y = 4$ exactly once.
- 24) **The correct answer is $\frac{34}{99}$.** (8.NS.A.1) Set $x = 0.\overline{34}$, so $100x = 34.\overline{34}$. Subtracting: $100x - x = 34$, giving $99x = 34$ and $x = \frac{34}{99}$.
- 25) **Choice B is correct.** (8.G.A.2) Congruent regular polygons have equal side lengths. Both octagons have side length 3 inches.
- 26) **Choice C is correct.** (8.G.A.5) Let the angles be $2x$, $3x$, and $4x$. Sum: $2x + 3x + 4x = 180$, so $9x = 180$ and $x = 20^\circ$. Smallest angle: $2x = 40^\circ$.
- 27) **Choice B is correct.** (8.G.B.7) Decompose the perimeter: two long sides of rectangle plus two semicircles (which form one complete circle). Long sides: $100 + 100 = 200$ m. Circle circumference: $\pi d = 3.14 \times 50 \approx 157$ m. Total $= 200 + 157 = 357$ m.
- 28) **Choice B is correct.** (8.G.A.5) Using $(n - 2) \times 180 = 540$, we get $n - 2 = 3$, so $n = 5$ (a pentagon).



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Hi, Confident Learner!

◇ This high-stamina book gave you nine substantial 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

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

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Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

- | | |
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| ✓ Expressions & Equations | ✓ Pythagorean Theorem |
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