

3

Michigan

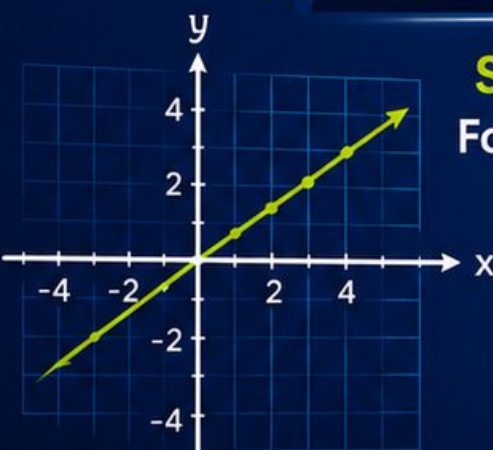
M STEP

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

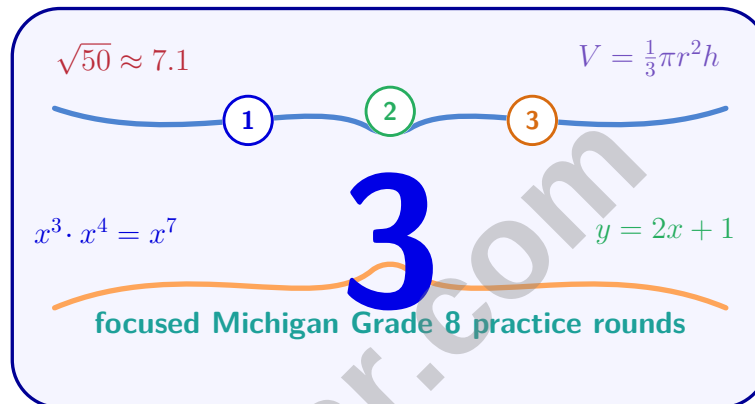
**ONLINE
TESTS**



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

3 Michigan M STEP Grade 8 Math Practice Tests

Standards-Based M STEP Practice with Answer Explanations



Three 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!

Three focused rounds for sharper M STEP math thinking

This book gives you three 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 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.

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?

Three M STEP 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.



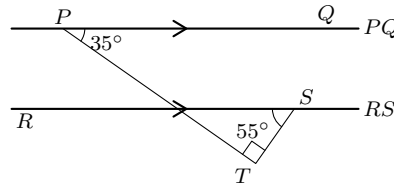
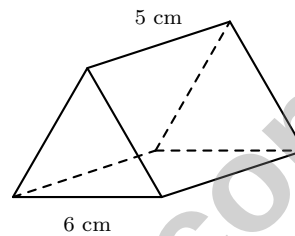
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1) In the figure, $PQ \parallel RS$. If angle $QPT = 35^\circ$ and angle $RST = 55^\circ$, find angle PTS .

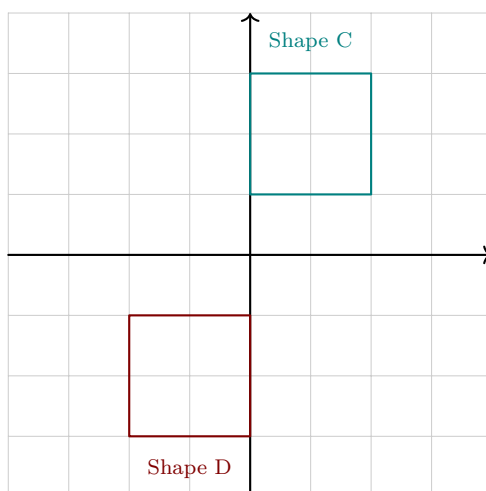

☐ A. 90°
☐ C. 110°
☐ B. 100°
☐ D. 120°


2)

An equilateral triangular prism has triangular bases with side length 6 cm and prism length (height) 5 cm. The height of each equilateral triangle is approximately 5.2 cm. What is the approximate total surface area?

☐ A. 31.2 cm^2
☐ C. 121.2 cm^2
☐ B. 46.8 cm^2
☐ D. 141 cm^2


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3)

If Shape C is rotated 180° about the origin, which shape results?

- ☐ A. Shape D
☐ B. The same shape (unchanged)
☐ C. A shape in Quadrant II
☐ D. A shape above the x -axis in Quadrant II

4) A line passes through $(1, 5)$ with slope $\frac{1}{2}$. What is the y -intercept?

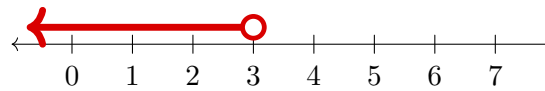
- ☐ A. 4
☐ B. $\frac{3}{2}$
☐ C. 5
☐ D. $\frac{9}{2}$

5) A student writes the equation $2x + 3 = 2x + 3$ and claims it has no solutions. Is the student correct? Explain.

- ☐ A. Yes; the equation simplifies to $0 = 0$, which is impossible
☐ B. No; the equation has one unique solution
☐ C. No; the equation is an identity with infinitely many solutions
☐ D. Cannot determine without solving



6) Solve: $x + 7 < 10$. Which number line shows the solution?



☐ A. $x < 3$

☐ C. $x \leq 3$

☐ B. $x > 3$

☐ D. $x \geq 3$

7) A cone has the same radius and height as a cylinder whose volume is 720 cubic inches. What is the cone's volume?

☐ A. 120 in^3

☐ C. 480 in^3

☐ B. 240 in^3

☐ D. 720 in^3

8) Which data scenario would MOST closely match a linear model $y = 0.5x + 15$?

☐ A. Bacteria population doubling every hour☐ C. Height of a ball after it bounces (decreasing bounce heights)☐ B. Water height in a tank filling at a constant rate☐ D. Compound interest in a savings account

9) Simplify using the laws of exponents: $\frac{x^7}{x^3}$

☐ A. x^{10}

☐ C. x^4

☐ B. x^{21}

☐ D. x^{-4}

10) What is $\sqrt[3]{1728}$?

☐ A. 10

☐ C. 12

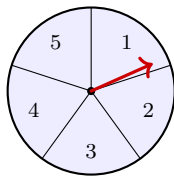
☐ B. 11

☐ D. 13

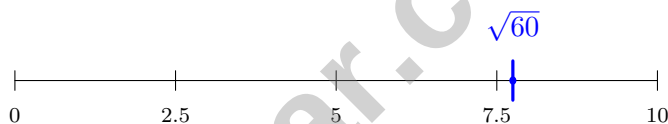


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- 1) A spinner has 5 equal sections labeled 1, 2, 3, 4, 5. You spin it twice. What is the probability of spinning a 3 on the first spin AND a 2 on the second spin?



- ☐ A. $\frac{1}{25}$ ☐ C. $\frac{2}{25}$
☐ B. $\frac{1}{5}$ ☐ D. $\frac{2}{5}$
- 2) What denominator appears when a repeating decimal has a 4-digit repeating block?
- ☐ A. 10 ☐ C. 999
☐ B. 100 ☐ D. 9999



3)

Based on the number line, which decimal is closest to $\sqrt{60}$?

- ☐ A. 7.5 ☐ C. 7.8
☐ B. 7.9 ☐ D. 7.7
- 4) Which is the best estimate of π ?

- ☐ A. 2.14 ☐ C. 3.14
☐ B. 3.0 ☐ D. 3.5



- 5) If $f(x) = \frac{x-1}{3}$ and $f(x) = 2$, find x .

- 6) A strand of DNA has width 2.0×10^{-9} m. Convert to standard form.

- ☐ A. 2,000,000,000 m ☐ C. 0.00000002 m
☐ B. 0.000000002 m ☐ D. 0.0000000002 m

- 7) A square pyramid-shaped roof covers a building with a square base of side length 10 m. The slant height is 13 m. What is the lateral surface area (the four triangular sides)?

- ☐ A. 130 m² ☐ C. 360 m²
☐ B. 260 m² ☐ D. 520 m²

- 8) 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. $(x, y) \rightarrow (-y - 3, x)$

- 9) Which equation has a negative slope?

- ☐ A. $y = 5x + 2$ ☐ C. $y = \frac{1}{4}x - 1$
☐ B. $y = -3x + 8$ ☐ D. $y = x + 6$



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- 1) A pyramid is half-filled with sand. The pyramid's total volume is 360 ft^3 . How much sand is in the pyramid?
- ☐ A. 90 ft^3 ☐ C. 180 ft^3
☐ B. 120 ft^3 ☐ D. 240 ft^3
- 2) A residual plot shows the residuals for a trend line fit to a data set. What would a residual plot with no clear pattern indicate?
- ☐ A. There are no residuals ☐ C. The data is nonlinear
☐ B. The trend line is a good fit ☐ D. The trend line is a poor fit
- 3) Pentagons $ABCDE$ and $FGHIJ$ are similar. Side $AB = 7 \text{ cm}$ and the corresponding side $FG = 14 \text{ cm}$. If $BC = 9 \text{ cm}$, what is the length of GH ?
- ☐ A. 4.5 cm ☐ C. 9 cm
☐ B. 18 cm ☐ D. 11.5 cm
- 4) A bus travels according to $d(t) = 55t$, where d is distance in miles and t is time in hours. How far has the bus traveled after 3 hours?
- ☐ A. 55 miles ☐ C. 165 miles
☐ B. 110 miles ☐ D. 185 miles
- 5) Which decimal representation indicates an irrational number?
- ☐ A. 0.875 ☐ D. $2.718281828\dots$ (non-repeating,
☐ B. $0.123123123\dots$ (repeating pattern) non-terminating)
☐ C. $0.5\overline{3}$ (where 3 repeats)



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6) Convert $0.4\overline{2}$ to a fraction in simplest form.

☐ A. $\frac{4}{20}$
☐ B. $\frac{42}{100}$

☐ C. $\frac{42}{99}$
☐ D. $\frac{38}{90} = \frac{19}{45}$

7) Between which two consecutive integers does $\sqrt[3]{20}$ lie?

☐ A. 4 and 5
☐ B. 1 and 2

☐ C. 3 and 4
☐ D. 2 and 3

8) Which number is irrational?

☐ A. $\sqrt{9}$
☐ B. 0.5

☐ C. $\sqrt{4}$
☐ D. $\sqrt{8}$

9) What is 9.0×10^{-5} in standard form?

☐ A. 90,000
☐ B. 0.9

☐ C. 0.00009
☐ D. 0.000009

10) A piggy bank has nickels and dimes totaling \$2.75. There are twice as many dimes as nickels. How many nickels are in the bank?

11) A rectangular prism has length 10 ft, width 5 ft, and surface area 250 ft^2 . What is its height?

☐ A. 3 ft
☐ B. 4 ft

☐ C. 5 ft
☐ D. 6 ft



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 A is correct.** **(8.G.A.5)** Using parallel line properties (alternate interior angles) and triangle angle sum: $35 + 55 + \angle PTS = 180$, so $\angle PTS = 90^\circ$.
- 2) **Choice C is correct.** **(8.G.C.9)** Two triangular bases: $2 \times \frac{1}{2}(6)(5.2) = 31.2 \text{ cm}^2$. Three rectangular sides: $3 \times (6 \times 5) = 90 \text{ cm}^2$. Total $\approx 31.2 + 90 = 121.2 \text{ cm}^2$.
- 3) **Choice A is correct.** **(8.G.A.1)** A 180° rotation about the origin takes a point in Quadrant I to Quadrant III. Shape C's corner at $(2, 3)$ maps to $(-2, -3)$, matching Shape D.
- 4) **Choice D is correct.** **(8.EE.B.6)** Using $y = mx + b$: $5 = \frac{1}{2}(1) + b$, so $5 = \frac{1}{2} + b$, thus $b = \frac{9}{2}$.
- 5) **Choice C is correct.** **(8.EE.C.7)** Both sides are identical ($2x + 3 = 2x + 3$), so the equation is true for all values of x . This is an identity, not "no solution."
- 6) **Choice A is correct.** **(8.EE.C.8b)** Subtract 7: $x < 3$. The open circle and left ray match this solution.
- 7) **Choice B is correct.** **(8.G.C.9)** Since $V_{\text{cone}} = \frac{1}{3}V_{\text{cyl}}$, the cone's volume is $\frac{1}{3} \times 720 = 240 \text{ in}^3$.
- 8) **Choice B is correct.** **(8.SP.A.3)** Only (B) changes at a constant positive rate, matching a line with positive slope. (A) and (D) are exponential, and (C) is not a steady linear pattern.
- 9) **Choice C is correct.** **(8.EE.A.1)** When dividing powers with the same base, subtract exponents: $\frac{x^7}{x^3} = x^{7-3} = x^4$.
- 10) **Choice C is correct.** **(8.EE.A.2)** $12 \times 12 \times 12 = 1728$, so $\sqrt[3]{1728} = 12$.
- 11) **Choice C is correct.** **(8.EE.A.4)** Divide: $\frac{1.5 \times 10^{11}}{3.8 \times 10^8} \approx \frac{1.5}{3.8} \times 10^3 \approx 0.39 \times 10^3 = 3.9 \times 10^2$.
- 12) **The correct answer is -2.** **(8.EE.A.3)** With the same coefficient, the smallest power has the smallest exponent: -2 .
- 13) **Choice A is correct.** **(8.EE.C.8a)** The two lines intersect at the point marked on the graph. At this point, both $x = 1$ and $y = 2$. Verify: $y = 1 + 1 = 2$ ✓ and $1 + 2 = 3$ ✓.
- 14) **Choice C is correct.** **(8.EE.C.7)** $(2x + 3)^2 = (2x)^2 + 2(2x)(3) + 3^2 = 4x^2 + 12x + 9$.
- 15) **The correct answer is $\frac{37}{300}$.** **(8.NS.A.1)** Set $x = 0.12\bar{3} = 0.12333\dots$. Then $100x = 12.\bar{3}$ and $1000x = 123.\bar{3}$. Subtracting: $900x = 111$, so $x = \frac{111}{900} = \frac{37}{300}$.
- 16) **Choice C is correct.** **(8.EE.C.8b)** Strict inequality ($<$) means a DASHED boundary line. Because y is LESS than the expression, shade BELOW the line.
- 17) **Choice C is correct.** **(8.F.A.2)** A grows at 50/hr. B grows at $(150 - 50)/2 = 50/\text{hr}$. Both equal.
- 18) **Choice C is correct.** **(8.F.A.3)** Absolute value functions are nonlinear. They produce a V-shaped graph, not a straight line.
- 19) **Choice A is correct.** **(8.F.B.4)** Area is length times width. The width is fixed at 5, so $A = \ell \cdot 5 = 5\ell$.
- 20) **Choice C is correct.** **(8.G.A.3)** Under 180° rotation, $(x, y) \rightarrow (-x, -y)$: $(1, 0) \rightarrow (-1, 0)$, $(3, 0) \rightarrow (-3, 0)$, $(2, 3) \rightarrow (-2, -3)$.
- 21) **The correct answer is A, C.** **(8.NS.A.1)** 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.
- 22) **Choice B is correct.** **(8.G.B.6, 8.G.B.7)** The diagonal is $d = \sqrt{70^2 + 24^2} = \sqrt{5476} = 74 \text{ m}$. Walking along the length and width is $70 + 24 = 94 \text{ m}$, so the diagonal is $94 - 74 = 20 \text{ m}$ shorter.
- 23) **Choice B is correct.** **(8.G.B.8)** Correct: $c^2 = 7^2 + 24^2 = 49 + 576 = 625$, so $c = 25$. The student mistakenly added the legs instead of squaring them.
- 24) **Choice B is correct.** **(8.G.B.7)** Corresponding angles are congruent: $7z - 8 = 5z + 20 \Rightarrow 2z = 28 \Rightarrow z = 14^\circ$.
- 25) **Choice B is correct.** **(8.G.B.7)** Decompose: rectangle and trapezoid. Rectangle area $= 7 \times 4 = 28 \text{ in}^2$. Trapezoid area $= \frac{1}{2}(7 + 3) \times 2 = 10 \text{ in}^2$. Total $= 28 + 10 = 38 \text{ in}^2$.
- 26) **Choice B is correct.** **(8.G.A.5)** A hexagon's interior angles add to 720° . The known angles add to $68 + 118 + 102 + 150 + 106 = 544^\circ$, so the sixth angle is $720 - 544 = 176^\circ$.



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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

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- ✓ 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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More Practice. More Confidence.
Better Results.