

8

Michigan

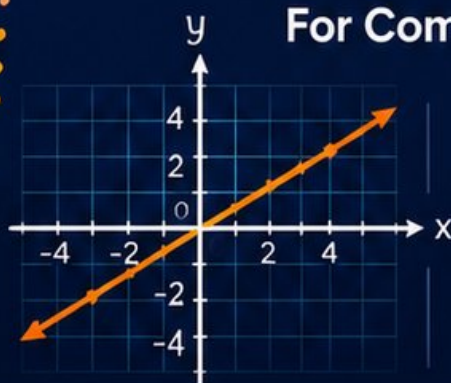
M STEP

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$A = \pi r^2$$
$$C = 2\pi r$$
$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}b^2 h$$



8

 PRINTED TESTS

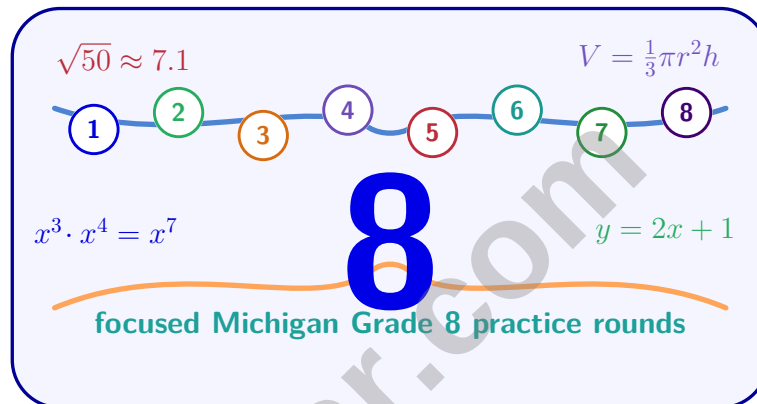
2

 ONLINE TESTS

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

8 Michigan M STEP Grade 8 Math Practice Tests

Michigan Grade 8 Practice for Equations, Functions, Geometry, and Data



Eight 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!

Eight focused rounds for sharper M STEP math thinking

This book gives you eight 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

An eight-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?

Eight M STEP tests, 320 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 7–8	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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Table of Contents

★ Practice Test 1	_____	15
★ Practice Test 2	_____	30
★ Practice Test 3	_____	44
★ Practice Test 4	_____	61
★ Practice Test 5	_____	76
★ Practice Test 6	_____	92
★ Practice Test 7	_____	109
★ Practice Test 8	_____	125
Practice Test Answer Keys	_____	142
Practice Test Answers and Explanations	_____	147

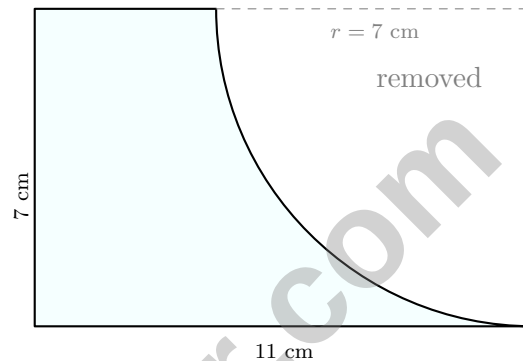
- 1) Points C and D are on a coordinate grid with $C = (0, 0)$ and $D = (7, 24)$. What is the distance from C to D ?

☐ A. 25

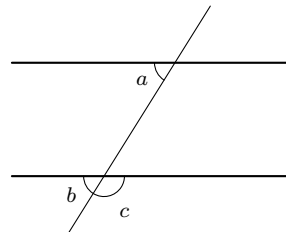
☐ C. $\sqrt{600}$
☐ B. 31

☐ D. 17

- 2) A composite figure is a rectangle (11 cm by 7 cm) with a quarter-circle ($radius = 7$ cm) removed from one corner. Find the remaining area. Use $\pi \approx 3.14$.


☐ A. 38.465 cm^2
☐ C. 77 cm^2
☐ B. 38.535 cm^2
☐ D. 115.465 cm^2

- 3) Two parallel lines are cut by a transversal. If angle $a = 52^\circ$, and angles a and b are corresponding angles, what is angle c if it is supplementary to angle b ?


☐ A. 52°
☐ C. 128°
☐ B. 104°
☐ D. 180°


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4) A square has a side length of 10 cm. What is the length of its diagonal?

☐ A. $10\sqrt{2}$ cm

☐ C. 10 cm

☐ B. 20 cm

☐ D. 100 cm

5) Pyramid A has dimensions: base edge 4 cm, height 6 cm. Pyramid B has all linear dimensions scaled by a factor of $\frac{3}{2}$. How does the volume of Pyramid B compare to Pyramid A?

☐ A. $\frac{3}{2}$ times larger

☐ C. $\frac{27}{8}$ times larger

☐ B. $\frac{9}{4}$ times larger

☐ D. 3 times larger

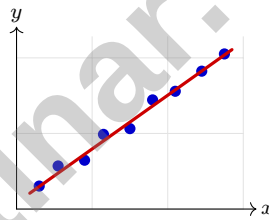
6) When rolling two six-sided dice, what is the probability of rolling a sum of 7?

☐ A. $\frac{1}{5}$

☐ C. $\frac{1}{12}$

☐ B. $\frac{1}{6}$

☐ D. $\frac{7}{36}$



7)

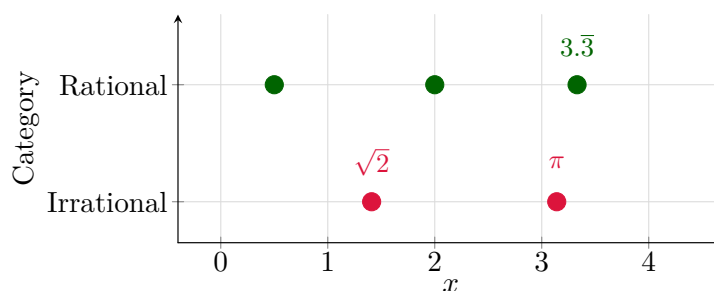
Which is the BEST description of a “line of best fit” on a scatter plot?

☐ A. A line that passes through every data point

☐ C. A line that generally shows the overall trend of the data

☐ B. A line that passes through no data points

☐ D. A line that only passes through the outliers

8)

Which number should be plotted as irrational (height 0)?

☐ A. 0.5

☐ C. $3.\bar{3}$
☐ B. 2

☐ D. $\sqrt{5}$
9) Convert $0.1\bar{3}$ to a fraction.
☐ A. $\frac{1}{13}$
☐ C. $\frac{13}{99}$
☐ B. $\frac{13}{100}$
☐ D. $\frac{2}{15}$
10) Which statement about $\sqrt{2} + 1$ is correct?
☐ A. It is rational

☐ C. It equals $\sqrt{3}$
☐ B. It is between 0 and 1

☐ D. It is irrational

11) Which list is in order from smallest to largest?

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

12) Which statement is true?

☐ A. $\sqrt{36}$ is irrational

☐ C. $\sqrt{11}$ is irrational

☐ B. π is rational

☐ D. $0.333\ldots$ is irrational


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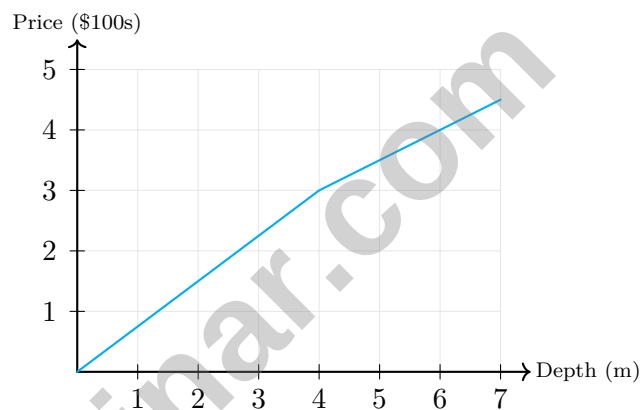
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1) A student claimed that if a cylinder's height is halved while radius is doubled, the volume stays the same. Is the student correct?

- ☐ A. Yes, volume is unchanged ☐ C. No, volume is quadrupled
☐ B. No, volume is doubled ☐ D. No, volume is halved

2) A line passes through (2, 10) and has slope 3. What is the y -intercept?

- ☐ A. 3 ☐ C. 10
☐ B. 4 ☐ D. 6



3)

The graph shows well-drilling cost vs. depth. Why does the slope change at 4 meters depth?

- ☐ A. The drilling cost stays the same at all depths ☐ C. The drilling stops at 4 meters
☐ B. Different rock layers require different rates ☐ D. Cost actually decreases, shown by a negative slope

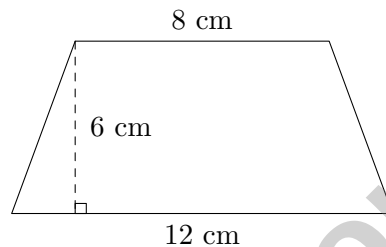


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- 4) A dilation with center at the origin and scale factor $\frac{1}{2}$ is applied to point $B(8, -6)$. What are the coordinates of B' ?

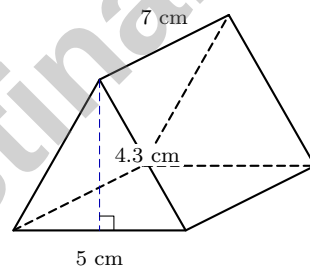
☐ A. $(4, -3)$ ☐ C. $(8, -3)$
☐ B. $(16, -12)$ ☐ D. $(4, -6)$

- 5) A trapezoid has parallel sides of 8 cm and 12 cm with a height of 6 cm. This trapezoid is part of a composite figure. What is its area?



☐ A. 48 cm^2 ☐ C. 72 cm^2
☐ B. 60 cm^2 ☐ D. 80 cm^2

6)



A triangular prism has equilateral triangular bases with side length 5 cm (height ≈ 4.3 cm) and depth 7 cm. What is the approximate total surface area?

☐ A. 21.5 cm^2 ☐ C. 126.5 cm^2
☐ B. 43 cm^2 ☐ D. 172.5 cm^2



1) Triangles MNO and PQR are similar. If $MN = 6$, $NO = 8$, and $PQ = 9$, find QR .

☐ A. 10

☐ C. 6.75

☐ B. 12

☐ D. 9.5

2) A figure is rotated 45° clockwise about the origin. Which of the following best describes what happens to a side parallel to the x -axis?

☐ A. It remains parallel to the x -axis

☐ D. It becomes perpendicular to the y -axis

☐ B. It becomes parallel to the y -axis

☐ C. It tilts at a 45° angle below the horizontal

3) Solve: $2(3 - x) \geq 4$

☐ A. $x \geq 1$

☐ C. $x \geq -1$

☐ B. $x \leq -1$

☐ D. $x \leq 1$

4) Two lines are parallel. If one line has equation $y = 4x - 2$, which could be the equation of the other line?

☐ A. $y = -4x + 7$

☐ C. $y = -\frac{1}{4}x + 5$

☐ B. $y = 2x + 4$

☐ D. $y = 4x + 9$

5) Solve for x : $-5x + 12 = -2x - 6$

☐ A. $x = -6$

☐ C. $x = -2$

☐ B. $x = 2$

☐ D. $x = 6$



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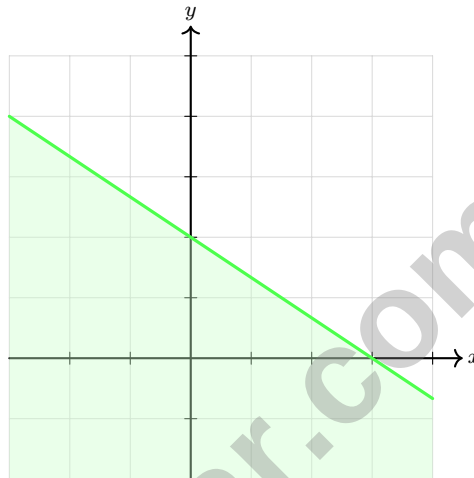
6) Solve the system:
$$\begin{cases} y = x + 2 \\ y = 2x - 1 \end{cases}$$

☐ A. (3, 5)

☐ C. (5, 7)

☐ B. (3, 1)

☐ D. (-1, 1)



7)

What is the inequality?

☐ A. $y > -\frac{2}{3}x + 2$

☐ C. $y \geq -\frac{2}{3}x + 2$

☐ B. $y < -\frac{2}{3}x + 2$

☐ D. $y \leq -\frac{2}{3}x + 2$

8) Temperature functions: Oven $T_{\text{oven}}(m) = 15m + 70$ (degrees, starting at 70). Freezer T_{freeze} shown in table: (0, -5), (2, -15), (4, -25). At 10 minutes, which is warmer?

m	0	2	4
T_{freeze}	-5	-15	-25

☐ A. Oven is warmer

☐ C. Same temperature

☐ B. Freezer is warmer

☐ D. Cannot be determined


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.B.8)** $d = \sqrt{(7-0)^2 + (24-0)^2} = \sqrt{49 + 576} = \sqrt{625} = 25$.
- 2) **Choice B is correct.** **(8.G.B.7)** Rectangle area is $11 \times 7 = 77 \text{ cm}^2$. The removed quarter-circle area is $\frac{1}{4} \times 3.14 \times 7^2 = 38.465 \text{ cm}^2$. Remaining area is $77 - 38.465 = 38.535 \text{ cm}^2$.
- 3) **Choice C is correct.** **(8.G.A.5)** Since a and b are corresponding angles with parallel lines, $b = a = 52^\circ$. If c is supplementary to b , then $c = 180 - 52 = 128^\circ$.
- 4) **Choice A is correct.** **(8.G.B.6, 8.G.B.7)** The diagonal of a square with side s is $s\sqrt{2}$. Using the Pythagorean Theorem: $10^2 + 10^2 = d^2$ gives $d = 10\sqrt{2}$.
- 5) **Choice C is correct.** **(8.G.C.9)** When linear scale is $k = \frac{3}{2}$, volume scales by $k^3 = \left(\frac{3}{2}\right)^3 = \frac{27}{8}$.
- 6) **Choice B is correct.** **(8.G.B.7)** Favorable outcomes: (1,6), (2,5), (3,4), (4,3), (5,2), (6,1). That's 6 outcomes. Total: $6 \times 6 = 36$. So $P(\text{sum} = 7) = \frac{6}{36} = \frac{1}{6}$.
- 7) **Choice C is correct.** **(8.SP.A.2)** A line of best fit minimizes the overall distance between itself and the data points, capturing the general trend. It rarely passes through every point.
- 8) **Choice D is correct.** **(8.NS.A.1)** Only $\sqrt{5}$ is irrational (a square root of a non-perfect square). The others are rational: $0.5 = \frac{1}{2}$, 2 is an integer, and $3.\bar{3} = \frac{10}{3}$.
- 9) **Choice D is correct.** **(8.NS.A.1)** Let $x = 0.1\bar{3} = 0.1333\dots$. Then $10x = 1.\bar{3}$ and $100x = 13.\bar{3}$. Subtracting: $100x - 10x = 12$, so $90x = 12$ and $x = \frac{12}{90} = \frac{2}{15}$.
- 10) **Choice D is correct.** **(8.NS.A.2)** Since $\sqrt{2}$ is irrational and 1 is rational, $\sqrt{2} + 1$ is irrational. (The sum of an irrational and a rational is irrational.)
- 11) **Choice D is correct.** **(8.EE.A.3)** With equal coefficients, smaller exponents give smaller values: $-5 < -3 < 1$.
- 12) **Choice C is correct.** **(8.NS.A.2)** $\sqrt{36} = 6$ (rational), π is irrational, and $0.333\dots = \frac{1}{3}$ (rational). $\sqrt{11}$ cannot be expressed as a ratio of integers.
- 13) **Choice A is correct.** **(8.G.B.7)** Interest costs: A: \$240 (total \$2,240); B: \$320 (total \$2,320); C: \$360 (total \$2,360); D: \$320 (total \$2,320). Option A has the lowest total cost.
- 14) **Choice C is correct.** **(8.EE.C.7b)** Arrange all 5 cards in sequence: $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ arrangements.
- 15) **Choice D is correct.** **(8.EE.A.1)** Negative exponent flips the fraction: $\left(\frac{1}{3}\right)^{-2} = \left(\frac{3}{1}\right)^2 = 3^2 = 9$.
- 16) **Choice A is correct.** **(8.EE.B.6)** Substitute: $-3 = -\frac{3}{4}(4) + b$, so $-3 = -3 + b$, thus $b = 0$.
- 17) **Choice D is correct.** **(8.EE.C.7)** Use $y = 2x + 1$: $9 = 2x + 1 \Rightarrow 8 = 2x \Rightarrow x = 4$.
- 18) **The correct answer is A,D.** **(8.F.B.4)** Option A is correct because the slope of d_1 is 3 km/h. Option D is correct because $3 > 2$, so Hiker 1 travels faster. Hiker 2 starts 5 km from the trailhead, Hiker 1 starts 2 km from the trailhead, and the hikers are at the same distance when $t = 3$, not $t = 2$.
- 19) **Choice C is correct.** **(8.EE.C.8a)** Add the equations: $(x + 2y) + (3x - 2y) = 10 + 2$, so $4x = 12$, giving $x = 3$. Substitute: $3 + 2y = 10$, so $2y = 7$ and $y = \frac{7}{2}$. Solution: $(3, \frac{7}{2})$.
- 20) **Choice B is correct.** **(8.F.A.3)** First differences: $8 - 5 = 3$, $12 - 8 = 4$, $17 - 12 = 5$. Non-constant differences indicate nonlinear growth.
- 21) **Choice D is correct.** **(8.EE.A.2)** $\sqrt{64} = 8$. The other numbers are not perfect squares.
- 22) **Choice D is correct.** **(8.EE.A.4)** Divide coefficients: $2.8 \div 7 = 0.4$. Subtract exponents: $10^{7-4} = 10^3$. Rewrite: $0.4 \times 10^3 = 4 \times 10^2$.
- 23) **Choice D is correct.** **(8.EE.B.5)** Runner B has a larger constant of proportionality ($8 > 6$), so Runner B travels farther in the same time.
- 24) **The correct answer is 4 intervals.** **(8.F.B.5)** The function changes sign at each x -intercept. For a polynomial, the sign pattern depends on the behavior of the function in regions between intercepts. Students should understand that zeros (intercepts) divide the domain into intervals where the function maintains a constant sign.
- 25) **Choice A is correct.** **(8.EE.C.7)** $(x - 3)^2 = (x - 3)(x - 3) = x^2 - 3x - 3x + 9 = x^2 - 6x + 9$.



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You Are Building Test Stamina

Hi, Stamina Builder!

◇ This wide-ranging book gave you eight serious Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. Completing practice tests builds more than math knowledge. It builds the focus needed to think clearly for a long stretch. ◇

★ **Remember this:** That stamina matters. On real test day, calm pacing can be just as important as remembering a formula. ★

Stamina Skills

- **Breathe:** Reset before a difficult page.
- **Pace:** Do not spend too long in one place.
- **Return:** Come back to skipped questions with fresh eyes.
- **Finish Strong:** Use the last minutes to check.

Grade 8 test-day tip: Practice a simple reset: pause, breathe, reread, then choose your next step.

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

Jay Daie

Your Test-Stamina Coach

PRACTICE TODAY, SUCCEED TOMORROW!

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror 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.



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
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- ✓ Transformations
- ✓ Inequalities
- ✓ Data Analysis & Graphing
- ✓ And More!



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