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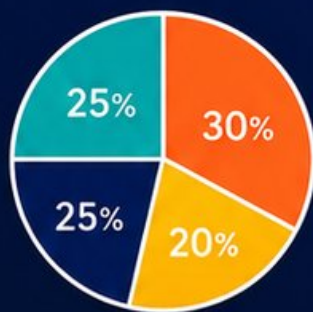
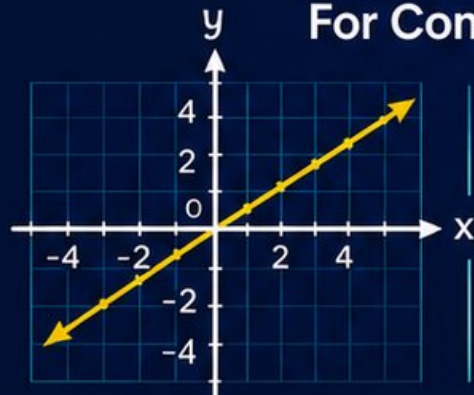
Michigan M STEP

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

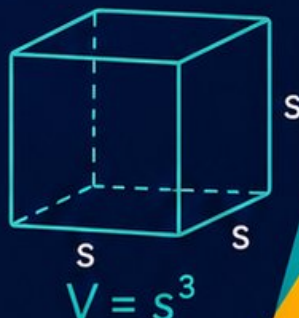


$$y = mx + b$$

$$2x - 3y = 6$$

$$\sqrt{x^2 + y^2}$$

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS

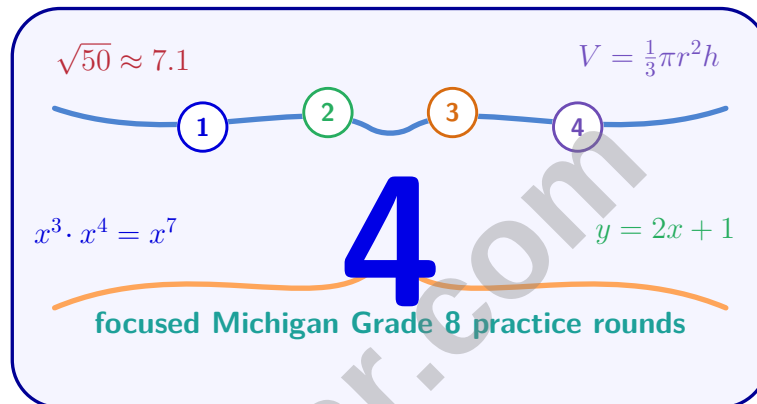


Use these **two additional online practice tests** for extra review after the printed tests in this book.



4 Michigan M STEP Grade 8 Math Practice Tests

Four Grade 8 M STEP Rounds with Keys, Review, and Explanations



Four 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!

Four focused rounds for sharper M STEP math thinking

This book gives you four 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 four-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?

Four M STEP tests, 160 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–4	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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& answers

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1) If $f(x) = -3x + 10$, what is $f(2)$?

☐ A. 4

☐ C. -6

☐ B. 16

☐ D. 6

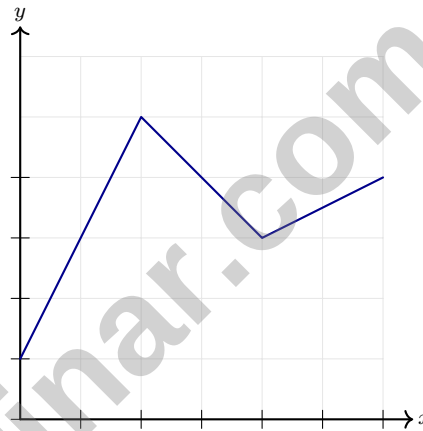
2) A 300 mL mixture contains 40% juice and 60% water. How much pure juice must be added to make the mixture 60% juice?

☐ A. 75 mL

☐ C. 150 mL

☐ B. 100 mL

☐ D. 200 mL



3)

Identify the maximum value and where it occurs.

☐ A. Max = 1 at $x = 4$

☐ C. Max = 3 at $x = 1$

☐ B. Max = 3 at $x = 2$

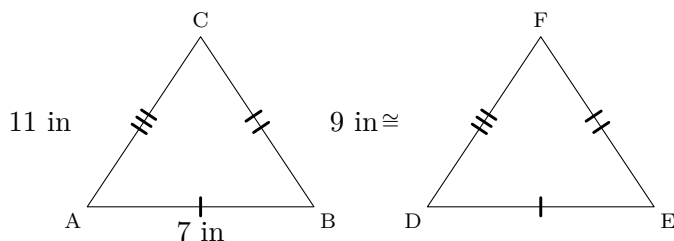
☐ D. Max = 4 at $x = 6$



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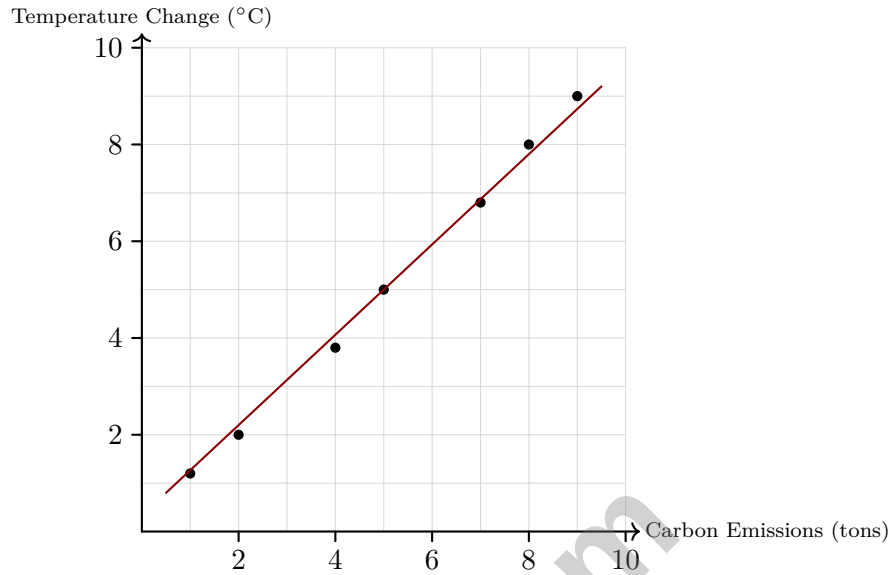
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- 4) Triangle ABC is congruent to triangle DEF. In triangle ABC: $AB = 7$ in, $BC = 9$ in, $AC = 11$ in. In triangle DEF, which side corresponds to side AC ?



- ☐ A. Side DE
- ☐ B. Side EF
- ☐ C. Side DF
- ☐ D. Cannot be determined from the diagram





5)

A scientist studies the relationship between carbon emissions and temperature change. The trend line shows a strong positive relationship. Which is the best interpretation?

- ☐ A. As carbon emissions increase, temperature tends to increase on average
☐ B. Temperature change has no relationship to emissions
☐ C. Higher temperatures cause carbon emissions
☐ D. The relationship is random

6) A segment has length 20 cm and is dilated by a scale factor of 0.4. What is the new length?

- ☐ A. 8 cm
☐ B. 20 cm
☐ C. 24 cm
☐ D. 50 cm



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1) For the inequality $y \leq -\frac{1}{2}x + 3$, which point is in the solution region?

☐ A. (0, 5)

☐ C. (2, 4)

☐ B. (0, 0)

☐ D. (4, 4)

2) A runner trains at 6 miles per hour. Write the equation $d = kt$ for distance d (miles) and time t (hours). What is k ?

3) Two points on a line are $(-3, 2)$ and $(3, -4)$. What is the slope?

☐ A. -1

☐ C. $-\frac{1}{6}$

☐ B. 1

☐ D. 6

4) A gym offers two membership plans. Plan A costs \$50 upfront plus \$10 per month. Plan B costs \$20 per month with no upfront fee. After how many months do the total costs equal?

☐ A. 3 months

☐ C. 5 months

☐ B. 4 months

☐ D. 6 months

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

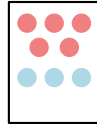
☐ A. 6 cm

☐ C. 12 cm

☐ B. 9 cm

☐ D. 18 cm





5 red, 3 blue

6)

A bag contains 5 red and 3 blue marbles. A marble is drawn, its color noted, replaced, then another marble is drawn. What is the probability both marbles are red?

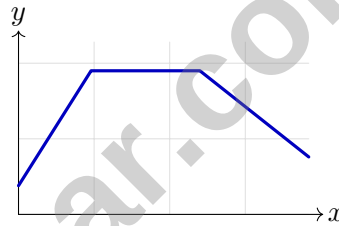
☐ A. $\frac{10}{64}$

☐ C. $\frac{10}{16}$

☐ B. $\frac{25}{64}$

☐ D. $\frac{5}{8}$

- 7) A graph shows temperature over a 24-hour period. The temperature rises steadily from 6am to noon, stays constant from noon to 6pm, and falls steadily from 6pm to midnight. At what time is the graph flat (constant)?


☐ A. 6am to noon

☐ C. 6pm to midnight

☐ B. Noon to 6pm

☐ D. All day


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- 1) A lab experiment measures the growth of bacteria. At 2 hours, there are 48 bacteria. The growth is proportional. What is the unit rate (bacteria per hour)?

☐ A. 12 bacteria/hour ☐ C. 24 bacteria/hour
☐ B. 20 bacteria/hour ☐ D. 30 bacteria/hour

- 2) A teacher records the height (in cm) of each student. Does the height function have more inputs or more outputs?

☐ A. More inputs, because each student maps to a height. ☐ C. Equal numbers, since the domain and range must match.
☐ B. More outputs, because height can vary. ☐ D. It depends on the specific students in the class.

- 3) Use the table below to find the y -intercept of the linear function:

x	1	3	5
y	9	17	25

- 4) A plane is descending. Its altitude decreases 2000 feet for every 5 minutes. What is the slope of altitude versus time?

☐ A. 400 feet per minute ☐ C. $\frac{5}{2000}$ feet per minute
☐ B. 2000 feet per minute ☐ D. -400 feet per minute



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& answers

- 5) Two rectangular fields have the same width. The first field is 50 m long and has a perimeter of 180 m. The second field is 60 m long and has a perimeter of 200 m. What is the width?

☐ A. 20 m ☐ C. 40 m
☐ B. 30 m ☐ D. 50 m

6) If $n(x) = \begin{cases} x + 2 & \text{if } x < 1 \\ 5 & \text{if } 1 \leq x < 4 \\ x - 1 & \text{if } x \geq 4 \end{cases}$, what is $n(2)$?

☐ A. 4 ☐ C. 3
☐ B. 5 ☐ D. 1

- 7) A rectangle MNOP undergoes a 90-degree clockwise rotation about its center. Which statement is true about rectangle M'N'O'P'?

☐ A. The area increases by half ☐ D. The rectangle is congruent to the original
☐ B. The shape is no longer a rectangle
☐ C. The area doubles

- 8) A right triangle has legs of length 1 and $\sqrt{3}$. What is the hypotenuse?

☐ A. 2 ☐ C. $\sqrt{2}$
☐ B. 4 ☐ D. 3



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.

**Scan me!**For more practice
& answers

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (8.F.A.1) Substitute $x = 2$: $f(2) = -3(2) + 10 = -6 + 10 = 4$.
- 2) **Choice C is correct.** (8.EE.C.8c) Initial juice: $0.40(300) = 120$ mL. After adding x mL pure juice: total juice = $120 + x$, total volume = $300 + x$. Setting to 60%: $\frac{120+x}{300+x} = 0.60$, so $120 + x = 0.60(300 + x) = 180 + 0.60x$, giving $0.40x = 60$, thus $x = 150$ mL.
- 3) **Choice B is correct.** (8.F.B.5) The highest point on the graph is at the second vertex, $(2, 3)$. All other points are lower.
- 4) **Choice C is correct.** (8.G.A.2) Side $AC = 11$ in is the longest side in triangle ABC. In congruent triangle DEF, side DF must be the longest side (11 in), so AC corresponds to DF .
- 5) **Choice A is correct.** (8.SP.A.2) The positive slope shows association: higher emissions correspond to higher temperatures on average.
- 6) **Choice A is correct.** (8.G.A.4) $20 \times 0.4 = 8$ cm. A scale factor between 0 and 1 creates a reduction.
- 7) **Choice C is correct.** (8.NS.A.1) Since $6^2 = 36$ and $6.3^2 = 39.69 \approx 40$, we have $\sqrt{40} \approx 6.3$. Also, $7^2 = 49 > 40$.
- 8) **Choice B is correct.** (8.EE.C.7b) Choose one bread and one topping: $2 \times 7 = 14$ different sandwiches.
- 9) **Choice D is correct.** (8.NS.A.1) Let $x = 0.8\overline{1}$. Then $100x = 81.\overline{81}$. Subtracting: $99x = 81$, so $x = \frac{81}{99} = \frac{9}{11}$.
- 10) **Choice C is correct.** (8.NS.A.2) The midpoint between 4 and 5 is 4.5. Check: $(4.5)^2 = 20.25$. Since $17 < 20.25$, we have $\sqrt{17} < 4.5$. Therefore $\sqrt{17}$ is closer to 4.
- 11) **Choice C is correct.** (8.NS.A.2) Since $7^2 = 49$ and $7.1^2 = 50.41$, we have $\sqrt{50} \approx 7.07$.
- 12) **Choice D is correct.** (8.EE.A.3) Move the decimal 1 place right: $2.9 \times 10^1 = 29$.
- 13) **The correct answer is 2.** (8.EE.B.5) Slope = $\frac{10-2}{4-0} = \frac{8}{4} = 2$.
- 14) **Choice D is correct.** (8.G.B.7) Account A: $I = 1000 \times 0.04 \times 5 = \200 . Account B: $A = 1000(1.03)^5 \approx 1159.27$, so interest $\approx \$159.27$. Account A earns more interest.
- 15) **Choice D is correct.** (8.G.C.9) $SA = 6(6)^2 = 6(36) = 216$ cm².
- 16) **Choice C is correct.** (8.G.A.1) A 90° counterclockwise rotation sends the rectangle to a vertical position. Translating that rotated image 5 units down matches the orange image.
- 17) **The correct answer is \$35.** (8.F.A.1) Compute $25 + 0.10(100) = 35$.
- 18) **Choice A is correct.** (8.EE.B.6) In slope-intercept form $y = mx + b$, the y -intercept is b . Here $b = -7$.
- 19) **Choice D is correct.** (8.EE.C.7) Check: $5(3) - 8 = 15 - 8 = 7 \neq 12$. Correct solution: Add 8: $5x = 20$. Divide by 5: $x = 4$.
- 20) **The correct answer is A,D.** (8.EE.B.5) The line goes through $(0, 0)$ and $(8, 4)$, so the slope and constant of proportionality are $\frac{4}{8} = 0.5$. A point on the line must have $y = 0.5x$; when $x = 6$, $y = 3$, so $(6, 3)$ is on the line.
- 21) **Choice D is correct.** (8.EE.C.8b) Solving: $-3x < 3$, so $x > -1$. Testing: $x = -2$ gives $-3(-2) + 4 = 10 \not< 7$ (false). So $x = -2$ does not satisfy.
- 22) **Choice D is correct.** (8.G.C.9) Use $V = \frac{1}{3}\pi r^2 h$: $392.5 = \frac{1}{3} \times 3.14 \times r^2 \times 15$. Since $\frac{1}{3} \times 15 = 5$, $392.5 = 15.7r^2$, so $r^2 = 25$ and $r = 5$ cm.
- 23) **Choice C is correct.** (8.SP.A.3) The line passes through $(0, 1)$ and $(4, 5)$. Slope = $\frac{5-1}{4-0} = \frac{4}{4} = 1$.
- 24) **Choice C is correct.** (8.EE.A.1) When exponents are equal: $\frac{t^9}{t^9} = t^{9-9} = t^0 = 1$ (for $t \neq 0$).
- 25) **Choice C is correct.** (8.EE.A.2) Both $9^2 = 81$ and $(-9)^2 = 81$, so both 9 and -9 are solutions.
- 26) **Choice D is correct.** (8.EE.A.4) Same exponents: $(5.2 - 1.5) \times 10^6 = 3.7 \times 10^6$.
- 27) **Choice D is correct.** (8.EE.C.8a) Simplify the second equation: $2y = 2x + 4$ becomes $y = x + 2$, the same as the first equation. They represent the same line, so they intersect at infinitely many points.
- 28) **Choice A is correct.** (8.EE.C.7) Difference of squares: $4x^2 - 9 = (2x)^2 - 3^2 = (2x - 3)(2x + 3)$.
- 29) **Choice B is correct.** (8.EE.C.8b) SOLID line means the boundary is INCLUDED ($\leq$ or $\geq$). Shading to the LEFT means x values are at most 4, so $x \leq 4$.



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 4 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!

Give your child the confidence and skills they need with **4 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!

4



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
- ✓ 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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