

MARYLAND MCAP

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



2

 ONLINE
TESTS

**Standards Aligned
Problem Solving For
Comprehensive Assessment Programs**



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



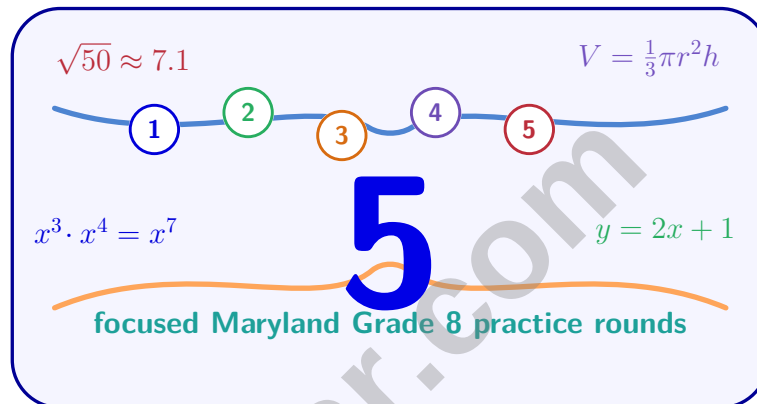
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 Maryland MCAP Grade 8 Math Practice Tests

Five MCAP Rounds for Functions, Systems, and Geometry



Five complete 40-question Grade 8 MCAP 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, Maryland Grade 8 Problem Solver!

Five focused rounds for sharper MCAP math thinking

This book gives you five full Grade 8 MCAP 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 Maryland 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 five-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.

Maryland 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?

Five MCAP tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
Answer Pages	Compact keys and explanations that show why each answer works.

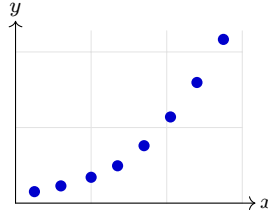
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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& answers

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1)

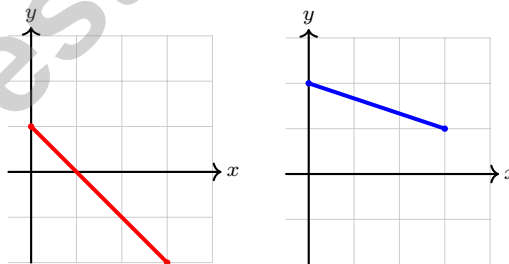
A scatter plot shows the population of a city over 50 years. The points follow an exponential growth curve: slow growth initially, then rapid growth. This is an example of:

- | | |
|---|---|
| ☐ A. Nonlinear association | ☐ D. Positive linear correlation with outliers |
| ☐ B. Negative linear correlation | |
| ☐ C. No correlation | |

2) Rectangle MNOP has length 15 cm and width 8 cm. Rectangle M'N'O'P' is congruent to MNOP. Which of the following is NOT a possible pair of dimensions for M'N'O'P'?

- | | |
|--|--|
| ☐ A. Length 15 cm, width 8 cm | ☐ C. Length 16 cm, width 8 cm |
| ☐ B. Length 8 cm, width 15 cm | ☐ D. Length 15 cm, width 8 cm (rotated) |

3) Which graph best represents a line with slope $-\frac{1}{3}$?



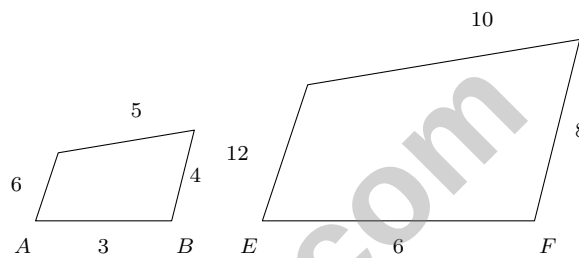
- | | |
|--|--|
| ☐ A. Red line (left) | ☐ C. Both have slope $-\frac{1}{3}$ |
| ☐ B. Neither has slope $-\frac{1}{3}$ | ☐ D. Blue line (right) |



- 4) A concert venue sells adult tickets for \$15 and student tickets for \$8. If 120 total tickets were sold for \$1,520, how many student tickets were sold?

☐ A. 40 ☐ C. 80
☐ B. 60 ☐ D. 100

- 5) Two quadrilaterals are shown. Quadrilateral $ABCD$ has sides 3, 4, 5, 6. Quadrilateral $EFGH$ has corresponding sides 6, 8, 10, 12, and their corresponding angles are congruent. Are they similar?



- ☐ A. No, angles are different ☐ C. Cannot tell without angles
☐ B. Yes, all sides are in ratio 1 : 2 ☐ D. Only if both are trapezoids
- 6) Given $f(x) = x^2$ and $g(x) = 2x + 1$, which statement is true?
- ☐ A. $f(3) = g(3)$ ☐ C. $f(3) < g(3)$
☐ B. $f(3) > g(3)$ ☐ D. Cannot be determined
- 7) The best-fit line for a summer temperature study is $T = 1.2m + 68$, where T is temperature in $^{\circ}\text{F}$ and m is the month number (with month 1 = June). What does the intercept of 68 represent in this context?

☐ A. The predicted temperature at month 0 (an extrapolated value) ☐ C. The maximum temperature observed
☐ B. The temperature increase per month ☐ D. The rate of temperature change month



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8) Which equation is LINEAR?

☐ A. $y = \frac{7}{2}x - 6$

☐ C. $y = 2^x$

☐ B. $y = x(x - 1)$

☐ D. $y = \frac{4}{x-1}$

9) Water drains from a tank at a rate of 3 gallons per minute. The tank starts with 120 gallons. Which equation gives the amount of water W (in gallons) after t minutes?

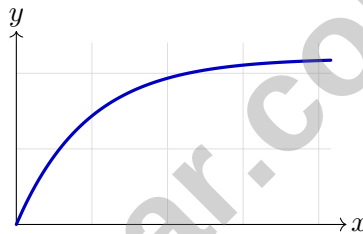
☐ A. $W = -3t + 120$

☐ C. $W = 120t - 3$

☐ B. $W = 3t + 120$

☐ D. $W = 120 - t$

10) Which real-world scenario matches: graph starts at origin, rises steeply, then gradually levels off?



☐ A. A plant growing slower and slower as it matures

☐ C. Water flowing out of a tank at constant rate

☐ B. A car accelerating uniformly over time

☐ D. A ball rolling down a ramp with no friction



- 1) Pentagons $ABCDE$ and $FGHIJ$ are similar. Side $AB = 7$ cm and the corresponding side $FG = 14$ cm. If $BC = 9$ cm, what is the length of GH ?

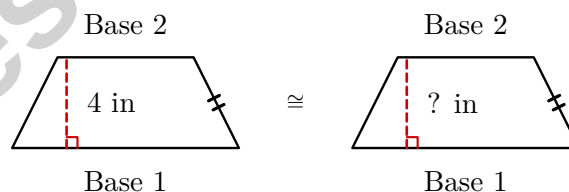
- ☐ A. 4.5 cm ☐ C. 9 cm
☐ B. 18 cm ☐ D. 11.5 cm

- 2) Evaluate 2^{-3} and express it as a decimal.

- 3) Real-world extrapolation: Email subscribers grow as $S(d) = 150 + 40d$ per day. Competitor at day 5 has 500 subscribers, day 10 has 700. Which will have more subscribers at day 15?

- ☐ A. First email service ☐ C. Both equal
☐ B. Competitor ☐ D. Cannot determine

- 4) Two congruent trapezoids are shown with side length markings. Trapezoid 1 has a height of 4 inches. What is the height of Trapezoid 2?



- ☐ A. 2 inches ☐ C. 8 inches
☐ B. 4 inches ☐ D. Cannot be determined



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- 5) A student earns \$15 per hour. Which table represents this relationship?

Hours	1	2	3
Earnings (\$)	15	30	45

What is the slope?

- ☐ A. 15 ☐ C. 30
- ☐ B. $\frac{1}{15}$ ☐ D. $\frac{15}{30}$
- 6) Alice, Bob, and Clara are three friends. Alice is twice as old as Bob. Clara is 1 year older than Bob. The sum of all their ages is 49 years. How old is Bob?
- ☐ A. 8 ☐ C. 12
- ☐ B. 10 ☐ D. 14
- 7) The temperature $T(h)$ in degrees Celsius at height h km above sea level is $T(h) = 25 - 6h$. What is $T(2)$?
- ☐ A. 37 ☐ C. 19
- ☐ B. 13 ☐ D. 50
- 8) A square park has an area of 169 square yards. What is the length of one side of the park?



1) If a square has side length $(x + 3)$, and a smaller square inside has side length $(x - 3)$, what is the difference in their areas?

☐ A. 6☐ B. 9☐ C. $12x$ ☐ D. x^2

2) A savings account earns 2% simple interest annually. If you deposit \$6,000, how much will you have after 2 years?

☐ A. \$6,120☐ B. \$6,180☐ C. \$6,240☐ D. \$6,300

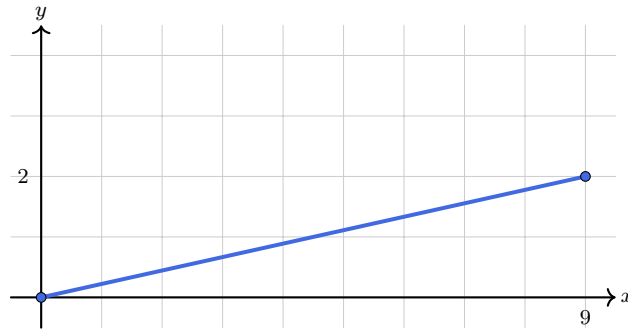
3) Simplify $\left(\frac{x}{y}\right)^2$ where $y \neq 0$.

☐ A. $\frac{2x}{2y}$ ☐ B. $\frac{x}{y^2}$ ☐ C. $\frac{x^2}{y^2}$ ☐ D. $\frac{x^2}{y}$

4) Estimate $\sqrt{99}$ to the nearest integer.

☐ A. 8☐ B. 9☐ C. 10☐ D. 11

5)



The slope is approximately:

☐ A. 0.18

☐ C. 4.5

☐ B. 9

☐ D. 0.22

- 6) 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

- 7) A virus has diameter 1.2×10^{-7} m. Bacteria has diameter 8×10^{-6} m. How many times larger is the bacterium than the virus?



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Maryland MCAP 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 Maryland MCAP practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** **(8.SP.A.1)** An exponential curve is nonlinear. The rate of change is not constant, increasing over time.
- 2) **Choice C is correct.** **(8.G.A.2)** Congruent rectangles have the same dimensions. M'N'O'P' must have dimensions 15 cm and 8 cm (possibly rotated). A rectangle with dimensions 16 cm and 8 cm is NOT congruent.
- 3) **Choice D is correct.** **(8.EE.B.5)** Red line: slope = $\frac{-2-1}{3-0} = \frac{-3}{3} = -1$. Blue line: slope = $\frac{1-2}{3-0} = \frac{-1}{3} = -\frac{1}{3}$. The blue line matches the target slope.
- 4) **Choice A is correct.** **(8.G.C)** Let a = adult tickets and s = student tickets. Then $a + s = 120$ and $15a + 8s = 1520$. Substitute $a = 120 - s$: $15(120 - s) + 8s = 1520$, so $1800 - 7s = 1520$. Then $7s = 280$, so $s = 40$.
- 5) **Choice B is correct.** **(8.G.A.4)** Verify each side ratio: $\frac{6}{3} = 2$, $\frac{8}{4} = 2$, $\frac{10}{5} = 2$, $\frac{12}{6} = 2$. All ratios are constant, so sides are proportional (scale factor 2). Combined with congruent corresponding angles, the quadrilaterals are similar.
- 6) **Choice B is correct.** **(8.F.A.1)** $f(3) = 3^2 = 9$ and $g(3) = 2(3) + 1 = 7$. Since $9 > 7$, we have $f(3) > g(3)$.
- 7) **Choice A is correct.** **(8.SP.A.3)** The y -intercept (68) is the predicted value when $m = 0$. Since month 0 is outside the observed summer data range, this is an extrapolation used to define the line mathematically.
- 8) **Choice A is correct.** **(8.F.A.3)** $y = \frac{7}{2}x - 6$ is linear with slope $\frac{7}{2}$ and y -intercept -6 . Option B expands to $y = x^2 - x$ (nonlinear), and C and D are exponential and rational functions.
- 9) **Choice A is correct.** **(8.F.B.4)** Initial water is 120 gallons (intercept). Drains 3 gallons per minute (negative slope). Equation: $W = -3t + 120$.
- 10) **Choice A is correct.** **(8.F.B.5)** Steep rise early (fast growth), then level off (approaching maximum) matches plant growth. B is linear, C is linear decrease, D accelerates (not levels off).
- 11) **Choice A is correct.** **(8.G.A.3)** Reflecting across the x -axis maps $(0, 1) \rightarrow (0, -1)$ and $(2, 2) \rightarrow (2, -2)$. Translating left 4 gives $(-4, -1)$ and $(-2, -2)$, matching the image rectangle.
- 12) **Choice B is correct.** **(8.G.A.5)** Alternate exterior angles are congruent: $7k - 3 = 5k + 17 \implies 2k = 20 \implies k = 10$.
- 13) **Choice A is correct.** **(8.G.B.6, 8.G.B.7)** Correct calculation: $10^2 + 10^2 = 100 + 100 = 200$, so $c = \sqrt{200} = \sqrt{100 \cdot 2} = 10\sqrt{2} \approx 14.14$. The student added the legs directly instead of using the Pythagorean Theorem.
- 14) **Choice B is correct.** **(8.G.B.8)** $d = \sqrt{(8-2)^2 + (12-4)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
- 15) **Choice B is correct.** **(8.G.B.7)** When parallel lines are cut by a transversal, corresponding angles are congruent. So the other angle also measures 70° .
- 16) **Choice A is correct.** **(8.G.C.9)** $V = \frac{1}{3} \times 25 \times 9 = 75 \text{ cm}^3$.
- 17) **Choice B is correct.** **(8.G.B.7)** Rectangle = $12 \times 8 = 96 \text{ m}^2$. Each triangle = $\frac{1}{2} \times 2 \times 2 = 2 \text{ m}^2$. Four triangles = 8 m^2 . Total = $96 + 8 = 104 \text{ m}^2$.
- 18) **Choice D is correct.** **(8.G.A.5)** For a 12-sided polygon: $(12 - 2) \times 180 = 10 \times 180 = 1800^\circ$.
- 19) **Choice D is correct.** **(8.SP.A.4)** Relative frequency among dine-in orders: $\frac{108}{180} = 0.60$. This is a row-conditional frequency.
- 20) **The correct answer is (5, 3).** **(8.EE.C)** Add the two equations to eliminate y : $(x + y) + (x - y) = 8 + 2$, so $2x = 10$, giving $x = 5$. Substitute into the first equation: $5 + y = 8$, so $y = 3$.
- 21) **The correct answer is 45.** **(8.EE.C.7)** Substitute $x = 1$: $(1 + 4)(1 + 8) = 5 \cdot 9 = 45$.
- 22) **The correct answer is A,D.** **(8.EE.B.5)** Line 1: $k = \frac{6}{4} = 1.5$, so $y = 1.5x$ (\$1.50/lb). Line 2: $k = \frac{12}{6} = 2$, so $y = 2x$ (\$2.00/lb). A is correct (Line 1 equation and price). D is correct (Line 2 has greater slope: $2 > 1.5$). C is wrong (Line 2 is steeper, not Line 1). B is correct but not a correct pair; E is subjective (worse deal, not better). Answer: A and D.
- 23) **Choice C is correct.** **(8.G.B.8)** Group 1's smaller MAD (2) shows less spread and more consistent performance. Group 2's larger MAD (10) indicates greater variability in scores.
- 24) **Choice D is correct.** **(8.G.B.7)** $P(\text{not } 7) = 1 - P(7) = 1 - \frac{1}{12} = \frac{11}{12}$.
- 25) **Choice B is correct.** **(8.NS.A.2)** Each position is independent: $26 \times 10 \times 26 \times 10 = 26^2 \times 10^2 = 676,000$.



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Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 5 full Grade 8 practice tests, and that repeated effort matters. ★

Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

Grade 8 test-day tip: When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

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

Jay Daie

Your Persistence Coach

Practice Today. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 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!



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 | ✓ 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! |

5
PRINTED
TESTS



2 ONLINE
TESTS



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