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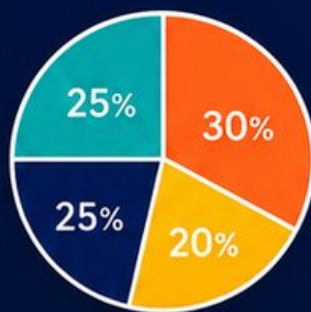
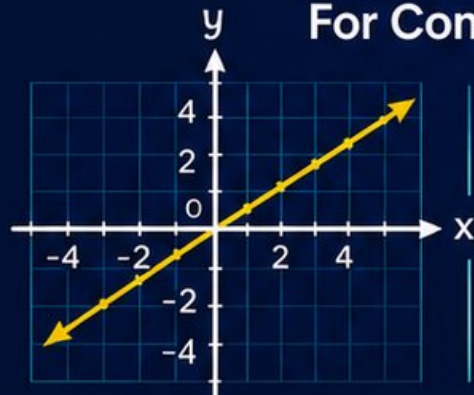
Maryland MCAP

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

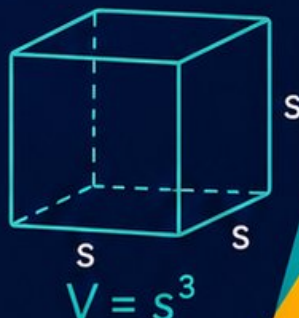


$$y = mx + b$$

$$2x - 3y = 6$$

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

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS



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



4 Maryland MCAP Grade 8 Math Practice Tests

Four MCAP Practice Rounds for Clear Grade 8 Math Growth



Four 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!

Four focused rounds for sharper MCAP math thinking

This book gives you four 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 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.

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?

Four MCAP 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) A sphere has a volume of approximately 523.33 m^3 . What is its radius? (Use $\pi \approx 3.14$.)

☐ A. 4 m☐ C. 10 m☐ B. 5 m☐ D. 20 m

- 2) The elevation rises 500 feet over a horizontal distance of 2000 feet. What is the slope?

- 3) 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

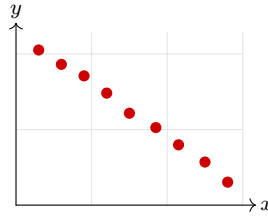
- 4) A student can take one math class and one science class. There are 3 math classes and 2 science classes available. How many combinations of classes are possible?

☐ A. $3 + 2 = 5$ ☐ C. $2^3 = 8$ ☐ B. $3 \times 2 = 6$ ☐ D. $3 \times 2 \times 2 = 12$

- 5) A student claims that a triangle with sides 4, 5, and 6 is a right triangle. What is wrong with this claim?

☐ A. The sides are too small☐ C. A triangle cannot have sides that are consecutive☐ B. $4^2 + 5^2 = 41 \neq 36 = 6^2$ ☐ D. The longest side must be even

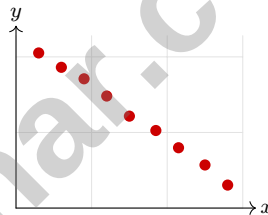
6)



A scatter plot shows the relationship between exercise frequency (days per week) and resting heart rate (bpm). The points form a clear downward trend with minimal scatter around the trend line. A student can infer that:

- | | |
|---|--|
| ☐ A. Exercise causes higher heart rates | ☐ C. Exercise and heart rate are unrelated |
| ☐ B. More exercise is associated with lower resting heart rate | ☐ D. Heart rate determines exercise frequency |

7)



A negative slope on a scatter plot indicates:

- | | |
|--|--|
| ☐ A. There is no relationship between the variables | ☐ C. As x increases, y increases on average |
| ☐ B. The line is horizontal | ☐ D. As x increases, y decreases on average |



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8) Trapezoid $PQRS$ is similar to Trapezoid $TUVW$ with scale factor $\frac{3}{2}$. If $PQ = 8$ cm in trapezoid $PQRS$, what is the length of TU in trapezoid $TUVW$?

☐ A. 12 cm

☐ C. 8 cm

☐ B. 5.33 cm

☐ D. 10.67 cm

9) Which number can be expressed as a fraction?

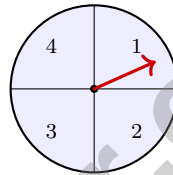
☐ A. $\sqrt{11}$

☐ C. $\frac{8}{3}$

☐ B. 2π

☐ D. $\sqrt{2} + 1$

10) A spinner with 4 equal sections is spun twice. What is the probability of landing on section 1 at least once?



☐ A. $\frac{7}{16}$

☐ C. $\frac{1}{8}$

☐ B. $\frac{9}{16}$

☐ D. $\frac{1}{2}$

11) A repeating decimal $0.\overline{d_1d_2d_3}$ (3 digits) will have which denominator when fully simplified?

☐ A. Always exactly 999 (before simplification).

☐ C. A factor of 999 (could be 27, 37, 111, 333, 999, ...).

☐ B. Always exactly 1000.

☐ D. A factor of 1000 (could be 8, 125, 200, ...).



1) A square has area 50 square units. What is the approximate length of its diagonal?

- ☐ A. $\sqrt{50}$ units ☐ C. 7.07 units (approximately $5\sqrt{2}$)
☐ B. 10 units ☐ D. 25 units

2) A store's revenue is $\$200 + \15 per item sold. What is the slope of revenue versus items sold?

- ☐ A. \$200 ☐ C. \$215
☐ B. \$30 ☐ D. \$15

3) A paint shop mixes white and colored paint. They want to make 50 liters of paint that is 60% colored. If they have unlimited supplies of 100% colored and 0% colored (white) paint, how many liters of colored paint do they need?

- ☐ A. 20 L ☐ C. 30 L
☐ B. 40 L ☐ D. 45 L

4) 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

5) Using the model $y = -2x + 15$, what is the predicted y -value when $x = 5.5$?

- ☐ A. 4 ☐ C. 10
☐ B. 5 ☐ D. 26



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- 6) Two lines intersect. One angle is 82° . What is the measure of an adjacent angle?

- 7) A student incorrectly calculates the relative frequency of vegetarians among age 18–40 as $\frac{84}{112}$ instead of $\frac{84}{196}$. What error did the student make?

- ☐ A. Used the column total instead of the row total.
- ☐ B. Used the grand total instead of the row total.
- ☐ C. Used the column total instead of the grand total.
- ☐ D. Forgot to convert to a percentage.

- 8) Two data sets both have 5 values and mean = 10: Set P: {8, 9, 10, 11, 12} Set Q: {1, 5, 10, 15, 19} Which set has the larger MAD?

- ☐ A. Set P
- ☐ B. Set Q
- ☐ C. Equal MAD
- ☐ D. Cannot compare

- 9) A restaurant offers 10 appetizers, 12 mains, 5 sides, and 6 desserts. A complete meal includes one appetizer, one side, and one dessert. How many different complete meals can be ordered?

- ☐ A. $10 + 5 + 6 = 21$
- ☐ B. $10 \times 12 \times 5 \times 6 = 3,600$
- ☐ C. $10 \times 5 \times 6 = 300$
- ☐ D. $(10 + 12) \times 5 \times 6 = 660$



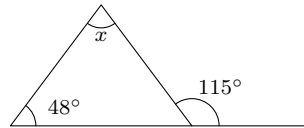
- 1) A mobile phone plan charges $M = 40 + 0.25x$, where M is monthly cost and x is gigabytes of data used. What does the slope tell you?
- ☐ A. The cost per gigabyte of data ☐ C. The maximum cost possible
☐ B. The fixed monthly charge ☐ D. The number of gigabytes included
- 2) A store notices that for 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. $\frac{1}{2}$
- 3) Tickets cost \$4 for children and \$7 for adults. The theater sold 200 tickets for a total of \$1,100. How many children's tickets were sold?
- ☐ A. 100 ☐ C. 50
☐ B. 150 ☐ D. 120
- 4) A line segment from (0,0) to (4,4) is dilated by scale factor 0.5 from the origin. Where does it map to?
- ☐ A. From (0,0) to (2,2) ☐ C. From (2,2) to (4,4)
☐ B. From (0,0) to (8,8) ☐ D. Remains the same
- 5) If $h(x) = 3x$, what is $h(-2)$?
- ☐ A. -6 ☐ C. -2
☐ B. 6 ☐ D. 3



- 6) If a segment has length 15 units and is dilated by scale factor $\frac{2}{3}$, what is the length of the dilated segment?

☐ A. 10 units
☐ B. 15 units
☐ C. 22.5 units
☐ D. 20 units

- 7) In the diagram below, the exterior angle of a triangle measures 115° . If one remote interior angle is 48° , what is the other remote interior angle?

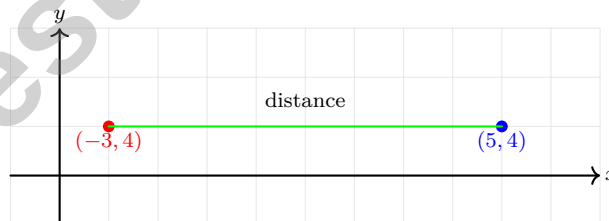


☐ A. 50°
☐ B. 60°
☐ C. 67°
☐ D. 115°

- 8) A right triangle has legs of $\sqrt{24}$ and 1. What is the hypotenuse in simplified form?

☐ A. $\sqrt{24}$
☐ B. 5
☐ C. $\sqrt{23}$
☐ D. 25

- 9) What is the horizontal distance between $(-3, 4)$ and $(5, 4)$?



☐ A. 4
☐ B. 8
☐ C. $\sqrt{63}$
☐ D. 1



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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 B is correct.** (8.G.C.9) From $V = \frac{4}{3}\pi r^3$, solving: $523.33 = \frac{4}{3} \times 3.14 \times r^3 \Rightarrow r^3 = 125 \Rightarrow r = 5$ m.
- 2) **The correct answer is $\frac{1}{4}$.** (8.EE.B.5) Slope = $\frac{500}{2000} = \frac{1}{4} = 0.25$.
- 3) **Choice C is correct.** (8.G.C) Let w = width. First field: $2(50) + 2w = 180$, so $100 + 2w = 180$, giving $2w = 80$ and $w = 40$ m. Check with second field: $2(60) + 2w = 200$, so $120 + 2w = 200$, giving $w = 40$ m. ✓
- 4) **Choice B is correct.** (8.NS.A.2) Choose from 3 math classes and 2 science classes: $3 \times 2 = 6$ possible combinations.
- 5) **Choice B is correct.** (8.G.B.6, 8.G.B.7) Error analysis: Verify using the converse. $16 + 25 = 41$ but $36 \neq 41$, so this is NOT a right triangle.
- 6) **Choice B is correct.** (8.SP.A.1) The downward trend shows negative correlation: as exercise increases, resting heart rate decreases. This is a typical physiological response.
- 7) **Choice D is correct.** (8.SP.A.2) A negative slope means the line tilts downward from left to right. This represents a negative association: as one variable increases, the other tends to decrease.
- 8) **Choice A is correct.** (8.G.A.4) Scale factor from $PQRS$ to $TUVW$ is $\frac{3}{2}$. So $TU = PQ \times \frac{3}{2} = 8 \times 1.5 = 12$ cm.
- 9) **Choice C is correct.** (8.NS.A.1) $\frac{8}{3}$ is already expressed as a fraction, so it is rational. All other options are irrational: $\sqrt{11}$ is a non-perfect-square root, 2π is an irrational multiple of π , and $\sqrt{2} + 1$ is an irrational plus a rational (still irrational).
- 10) **Choice A is correct.** (8.G.B.7) $P(\text{at least one } 1) = 1 - P(\text{no } 1) = 1 - (\frac{3}{4})^2 = 1 - \frac{9}{16} = \frac{7}{16}$.
- 11) **Choice C is correct.** (8.NS.A.1) The initial denominator is $999 = 3^3 \times 37$. After simplifying (if the GCD > 1), the denominator divides 999.
- 12) **Choice D is correct.** (8.NS.A.2) $7.7^2 = 59.29$ and $7.8^2 = 60.84$. The number 60 is a little closer to 59.29 than to 60.84, so $\sqrt{60} \approx 7.746$ is closer to 7.7 than to 7.8.
- 13) **Choice D is correct.** (8.NS.A.2) $\sqrt{3} \approx 1.73$, so $\sqrt{3} + 1 \approx 2.73$, which falls between 2 and 3. Distractors A, C, and D represent underestimation, overestimation, and far overestimation of $\sqrt{3}$.
- 14) **Choice D is correct.** (8.EE.A.3) The student's coefficient 56.2 is outside $[1, 10)$. Correct form requires moving the decimal one more place: 5.62×10^4 .
- 15) **Choice C is correct.** (8.G.C.9) Lateral surface area uses the slant height (not altitude). Each triangular face has base 6 and height (slant height) 5: area = $\frac{1}{2}(6)(5)$. Four triangles give $4 \times \frac{1}{2}(6)(5) = 60$ m². Options A and D incorrectly use altitude (4) instead of slant height.
- 16) **The correct answer is 12.** (8.SP.A.3) Set $y = 12$: $12 = -3x + 48 \Rightarrow -3x = -36 \Rightarrow x = 12$.
- 17) **Choice D is correct.** (8.EE.B.6) Using $y = mx + b$: $3 = -1(1) + b$, so $3 = -1 + b$, thus $b = 4$.
- 18) **Choice A is correct.** (8.EE.C.7) Base cost is \$30. Each text adds \$0.15. Total is \$45, so $30 + 0.15t = 45$.
- 19) **Choice C is correct.** (8.EE.C.7) Dividing by -6 requires flipping: $x \leq 4$, not $x \geq 4$.
- 20) **Choice C is correct.** (8.G.B.8) Dashed lines correspond to STRICT inequalities ($<$ and $>$), which do not include the boundary. The symbols $\leq$ and $\geq$ use solid lines.
- 21) **The correct answer is A,B.** (8.F.A.1) Verify each value: $f(1) = 3$ and $f(3) = 7$, so A and B are correct. Also, $f(2) = 5$, $f(0) = 1$, and $f(4) = 9$, so C, D, and E are false.
- 22) **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.
- 23) **Choice D is correct.** (8.G.B.7) $A = 5000(1.07)^{10} \approx 5000 \times 1.967 = \$9,835$.
- 24) **Choice D is correct.** (8.EE.A.1) The quotient rule shows: $\frac{x^5}{x^5} = x^{5-5} = x^0$. Since $\frac{x^5}{x^5} = 1$, we have $x^0 = 1$.
- 25) **Choice D is correct.** (8.EE.A.2) $3^3 = 27$ and $4^3 = 64$. Since $27 < 50 < 64$, we have $3 < \sqrt[3]{50} < 4$.
- 26) **Choice C is correct.** (8.EE.A.4) Divide: $\frac{3 \times 10^5}{5 \times 10^4} = \frac{3}{5} \times 10^{5-4} = 0.6 \times 10^1 = 6$. So 3×10^5 is about 6 times larger.
- 27) **Choice C is correct.** (8.EE.B.5) Equation: $y = 20x$. For $x = 8$: $y = 20(8) = 160$ plants.



You Know More Than You Think

Hi, Skilled Learner!

◇ After working through Grade 8 practice, you now have more tools than you may realize: models, formulas, graphs, equations, and reasoning habits. ◇

★ **Remember this:** The next step is learning when to use each tool. That comes from practice, review, and the courage to try a method even when you are unsure. This version gave you 4 opportunities to rehearse test-day habits. ★

Tools You Can Use

- **Models:** Make relationships visible.
- **Equations:** Represent unknowns clearly.
- **Graphs:** Show change and location.
- **Formulas:** Organize measurement problems.

Grade 8 test-day tip: Before solving, name the tool you plan to use. That small choice makes your work more intentional.

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

Jay Daie

Your Skill-Building Coach

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!



4 PRINTED TESTS

+



2 ONLINE TESTS



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