

MASSACHUSETTS

MCAS

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



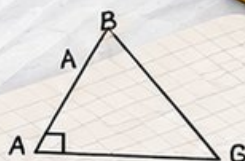
2

 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.



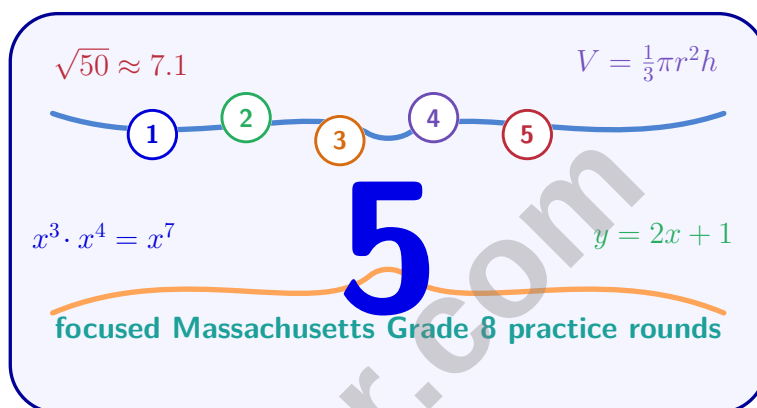
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 Massachusetts MCAS Grade 8 Math Practice Tests

Smart MCAS Review for Algebra, Geometry, and Statistics



Five complete 40-question Grade 8 MCAS 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, Massachusetts Grade 8 Problem Solver!

Five focused rounds for sharper MCAS math thinking

This book gives you five full Grade 8 MCAS 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 Massachusetts 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.

Massachusetts 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 MCAS 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.

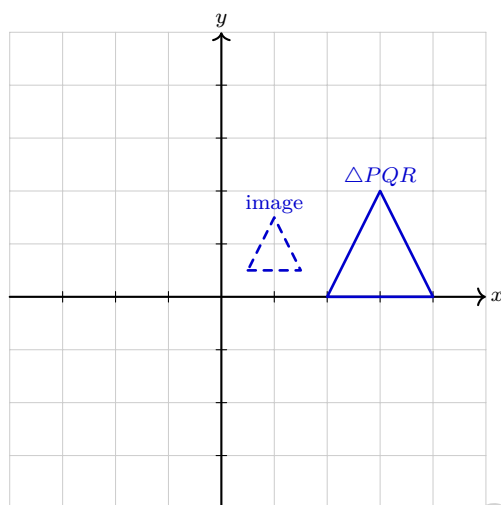
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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1)

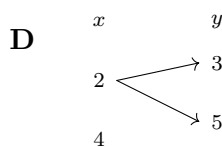
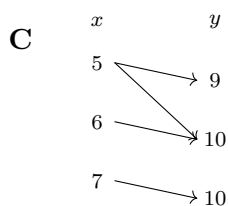
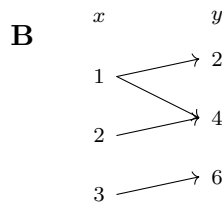
The solid blue triangle PQR is dilated to form the dashed blue image. What is the scale factor?

☐ A. 4

☐ C. 2

☐ B. $\frac{1}{4}$
☐ D. $\frac{1}{2}$

2) Which mapping diagram represents a function?



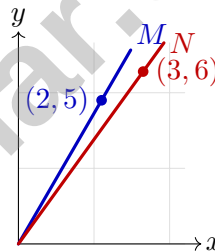
3) Function $m(x) = -2x + 5$ compared to the x -axis. Which statement about this function is true?

- ☐ A. Slope is positive and y -intercept is negative
- ☐ B. Slope is negative and y -intercept is positive
- ☐ C. Slope is negative and y -intercept is negative
- ☐ D. Slope is positive and y -intercept is positive

4) A snowpile melts at a rate of 4 inches per day. If it starts at 60 inches, which equation models the height h after d days?

- ☐ A. $h = 60d - 4$
- ☐ B. $h = -4d + 60$
- ☐ C. $h = 4d + 60$
- ☐ D. $h = 60 - d$

5) Two lines are shown on the same graph. Line M passes through $(0, 0)$ and $(2, 5)$. Line N passes through $(0, 0)$ and $(3, 6)$. Which statement is true?



- ☐ A. Line M is steeper
- ☐ B. Line N is steeper
- ☐ C. Both lines have the same steepness
- ☐ D. Cannot be determined from the information

6) Which system best models: "The sum of two numbers is 20. Their difference is 4"?

- ☐ A. $x + y = 20$; $x - y = 4$
- ☐ B. $x + y = 20$; $x + y = 4$
- ☐ C. $x \cdot y = 20$; $x/y = 4$
- ☐ D. $x = 20$; $y = 4$



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7) A student evaluated $f(x) = 3x + 2$ at $x = 4$ and wrote $f(4) = 3 + 2 + 4 = 9$. What error did the student make?

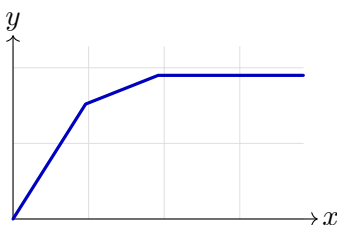
- ☐ A. Did not multiply x by the coefficient 3 ☐ C. Added the constant instead of substituting correctly
- ☐ B. Multiplied 3 by 4 correctly but made an arithmetic mistake ☐ D. The answer is correct

8) Two points are $(2, 5)$ and $(4, 11)$. What is the slope of the line through them?

- ☐ A. 3 ☐ C. 6
- ☐ B. $\frac{1}{3}$ ☐ D. -3

9) A bakery produces 50 cookies per hour. After 4 hours, how many cookies have been produced?

10) A student studies for an exam and creates a graph: time studied vs. score. The first 2 hours give a big score boost, the next 2 hours give less improvement, and after that, no more gains. What is the graph shape?



- ☐ A. Steep rise, then gentle rise, then flat ☐ C. Steep rise throughout
- ☐ B. Gradual rise throughout ☐ D. Flat throughout (no improvement)



- 1) A student claims that sides 5, 10, and $\sqrt{125}$ form a right triangle. Is this correct?
- ☐ A. Yes, because $5^2 + 10^2 = (\sqrt{125})^2$ ☐ C. Yes, because 5 and 10 are factors of $\sqrt{125}$
- ☐ B. No, because $\sqrt{125} \approx 11.2$, which is too large ☐ D. No, because $5 + 10 \neq \sqrt{125}$
- 2) Which relation is a function?
- ☐ A. A student and the clubs they joined (a student may join more than one club). ☐ C. A person and the phone numbers they use (a person may use more than one phone number).
- ☐ B. A book title and its author (a book has multiple authors). ☐ D. A country and its capital (one country, one capital).
- 3) Line A passes through $(0, 0)$ and $(3, 6)$. Line B passes through $(0, 1)$ and $(2, 7)$. Which line increases faster?
- ☐ A. Line A ☐ C. Both increase equally.
- ☐ B. Line B ☐ D. Cannot determine.
- 4) Which function is NOT proportional (i.e., does not pass through the origin)?
- ☐ A. $y = 3x$ ☐ C. $y = 2x + 1$
- ☐ B. $y = 5x$ ☐ D. $y = \frac{1}{2}x$
- 5) A cyclist travels at a constant speed. After 1.5 hours, they have traveled 22.5 miles. After 3 hours, they have traveled 45 miles. What is the slope (speed in mph)?
- ☐ A. 15 mph ☐ C. 30 mph
- ☐ B. 22.5 mph ☐ D. 45 mph



- 6) A register contains pennies, nickels, and dimes. There are twice as many nickels as pennies, and twice as many dimes as nickels. If there are 70 coins total, how many pennies are there?
- ☐ A. 5 ☐ C. 10
☐ B. 8 ☐ D. 12
- 7) A business profit function is $P(x) = 50x - 200$, where x is the number of units sold. What is the profit when 10 units are sold?
- ☐ A. \$300 ☐ C. \$200
☐ B. \$250 ☐ D. \$500
- 8) A bike travels at 12 miles per hour. The equation is $d = 12t$, where d is distance in miles and t is time in hours. How far does the bike travel in 3.5 hours?
- ☐ A. 30 miles ☐ C. 42 miles
☐ B. 36 miles ☐ D. 48 miles
- 9) For which system do the two equations represent parallel lines?
- ☐ A. $y = 2x + 1$ and $y = 2x - 3$ ☐ C. $y = 2x + 1$ and $y = x + 3$
☐ B. $y = 2x + 1$ and $y = -\frac{1}{2}x + 1$ ☐ D. $y = 2x + 1$ and $y = 2x + 1$
- 10) Factor $x^2 - 2x - 15$.
- ☐ A. $(x - 5)(x + 3)$ ☐ C. $(x - 15)(x + 1)$
☐ B. $(x + 5)(x - 3)$ ☐ D. $(x - 1)(x - 15)$



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- 1) Three solids have the same radius $r = 2$ cm. A cylinder with height 6 cm, a cone with height 6 cm, and a sphere. Rank them by volume from smallest to largest. (Use $\pi \approx 3.14$.)

- ☐ A. Cone, Sphere, Cylinder ☐ C. Cylinder, Sphere, Cone
☐ B. Sphere, Cone, Cylinder ☐ D. Cone, Cylinder, Sphere

- 2) In the list 5.2×10^{-2} , 5.2×10^0 , 5.2×10^2 , 5.2×10^{-1} , what is the exponent of the smallest number?

- 3) A person compares two loans for \$2,000:

Loan	APR	Term
X	5%	2 years
Y	4%	3 years

If the person wants to minimize total borrowing cost, which loan is better?

- ☐ A. Need more information ☐ C. They cost the same
☐ B. Loan Y ☐ D. Loan X
- 4) Which expression equals 2^{10} ?

- ☐ A. $2^5 + 2^5$ ☐ C. $(2^5)^2$
☐ B. $2^6 + 2^4$ ☐ D. $2^{15} \div 2^6$



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

☐ A. 10

☐ C. 12

☐ B. 11

☐ D. 13

6) The distance from Earth to the Moon is approximately 3.8×10^8 meters. The distance from Earth to the Sun is approximately 1.5×10^{11} meters. How many times farther is the Sun than the Moon?

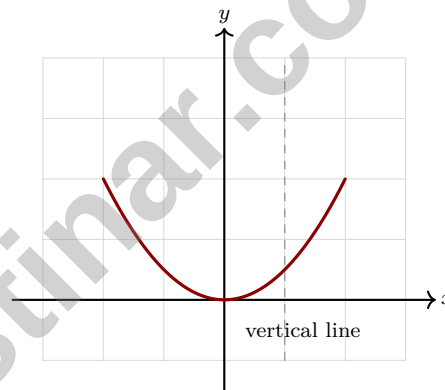
☐ A. $\approx 3.9 \times 10^3$

☐ C. $\approx 3.9 \times 10^2$

☐ B. $\approx 2.5 \times 10^{-3}$

☐ D. $\approx 5.3 \times 10^{18}$

7) A vertical line test is performed on the graph below. How many times does a vertical line intersect the curve?



☐ A. Zero times (the line misses the curve).

☐ C. Twice (the line intersects at two points).

☐ B. Once (the line intersects at one point).

☐ D. More than twice.



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Massachusetts MCAS 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 Massachusetts MCAS practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.G.A.3) The original triangle has base 2 (from (2,0) to (4,0)). The image has base 1. Scale factor: $\frac{1}{2}$.
- 2) **Choice A is correct.** (8.F.A.1) Option A has each input mapping to exactly one output. Option B has input 1 mapping to two outputs. Option C has input 5 mapping to two outputs. Option D has input 2 mapping to two outputs.
- 3) **Choice B is correct.** (8.F.A.2) From $m(x) = -2x + 5$, slope $m = -2 < 0$ (negative) and y -intercept $b = 5 > 0$ (positive).
- 4) **Choice B is correct.** (8.F.B.4) Initial height is 60 inches (intercept). Melts (decreases) at 4 inches per day (negative slope). Equation: $h = -4d + 60$.
- 5) **Choice A is correct.** (8.EE.B.5) Line M : slope $= \frac{5}{2} = 2.5$. Line N : slope $= \frac{6}{3} = 2$. Since $2.5 > 2$, line M is steeper.
- 6) **Choice A is correct.** (8.G.C) "Sum" translates to $x + y = 20$. "Difference" translates to $x - y = 4$ (or $y - x = 4$, depending on order). Options B, C, and D do not match these descriptions.
- 7) **Choice A is correct.** (8.F.A.1) The correct evaluation is $f(4) = 3(4) + 2 = 12 + 2 = 14$. The student treated 3 as an addend instead of multiplying it by 4.
- 8) **Choice A is correct.** (8.F.A.3) Slope $= \frac{11-5}{4-2} = \frac{6}{2} = 3$.
- 9) **The correct answer is 200.** (8.EE.B.5) Compute $50 \times 4 = 200$.
- 10) **Choice A is correct.** (8.F.B.5) Diminishing returns: initial rapid gains, then slower gains, then ceiling. The slope decreases then becomes zero.
- 11) **Choice C is correct.** (8.G.A.2) Perimeter of PQRS $= 10 + 14 + 5 + 7 = 36$ cm. Since TUVW is congruent to PQRS, its perimeter is also 36 cm.
- 12) **Choice A is correct.** (8.G.A.5) Adjacent angles on a straight line are supplementary: $123 + x = 180$, so $x = 57^\circ$.
- 13) **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 $y = 3$.
- 14) **Choice B is correct.** (8.G.B.8) $10^2 = 6^2 + b^2$, so $100 = 36 + b^2$, thus $b^2 = 64$ and $b = 8$ units.
- 15) **Choice A is correct.** (8.G.B.7) Let the smaller angle be x . Then $3x + x = 90$, so $4x = 90$ and $x = 22.5^\circ$.
- 16) **Choice C is correct.** (8.G.C.9) Base: $B = \frac{1}{2} \times 5 \times 12 = 30$ in². Volume: $V = \frac{1}{3} \times 30 \times 4 = 40$ in³.
- 17) **Choice A is correct.** (8.G.A.5) The sum for a regular octagon is $(8 - 2) \times 180 = 1080^\circ$. Each angle is $\frac{1080}{8} = 135^\circ$.
- 18) **Choice B is correct.** (8.SP.A.1) A U-shaped (parabolic) curve is nonlinear. It cannot be well-approximated by a straight line. The relationship changes direction, which is incompatible with simple linear regression assumptions.
- 19) **Choice A is correct.** (8.SP.A.4) Men voting yes $= 120 - 75 = 45$. Relative frequency $= \frac{45}{120} = 0.375 = 37.5\%$.
- 20) **The correct answer is B,E.** (8.EE.A.4) The product is $(4 \times 5) \times 10^{3+4} = 20 \times 10^7 = 2 \times 10^8$, so choices B and E are equivalent to the original expression. Choice A uses an exponent that is too large, and choices C and D have the wrong value.
- 21) **The correct answer is 100.** (8.EE.C.7) Substitute $x = 1$: $(1 + 9)^2 = 100$.
- 22) **Choice B is correct.** (8.G.B.8) Larger MAD (Set B = 9 vs Set A = 3) indicates greater variability and less predictability in where values fall relative to the mean.
- 23) **Choice B is correct.** (8.G.B.7) The table shows $2 \times 3 = 6$ outcomes total.
- 24) **Choice C is correct.** (8.NS.A.2) Apply the Counting Principle: 10 appetizers $\times 5$ sides $\times 6$ desserts $= 300$ different meals.
- 25) **Choice C is correct.** (8.G.B.6, 8.G.B.7) From $(\sqrt{15})^2 + b^2 = (\sqrt{31})^2$, we get $15 + b^2 = 31$, so $b^2 = 16$ and $b = 4$.
- 26) **Choice A is correct.** (8.SP.A.2) The slope of the line $y = 0.65x + 2.5$ is 0.65, representing the predicted weight gain per month.
- 27) **Choice C is correct.** (8.G.A.4) The area ratio smaller:larger is $\frac{9}{16}$. The linear ratio is $\sqrt{\frac{9}{16}} = \frac{3}{4}$, so the scale factor from the smaller polygon to the larger polygon is the reciprocal, $\frac{4}{3}$.



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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.