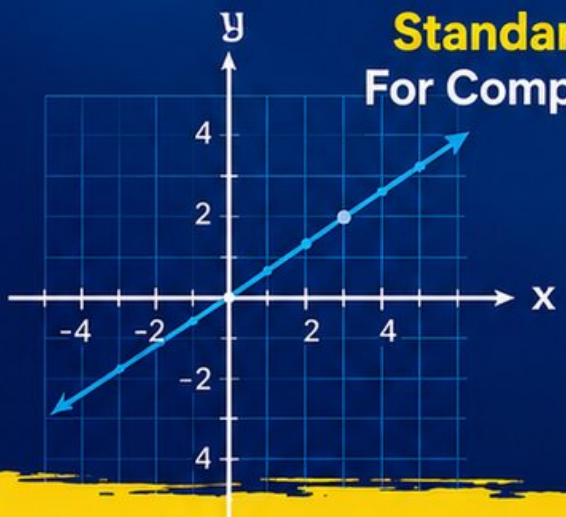
9 Massachusetts MCAS Grade 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$2x + 3y = 12$

$y = mx + b$

$V = s^3$

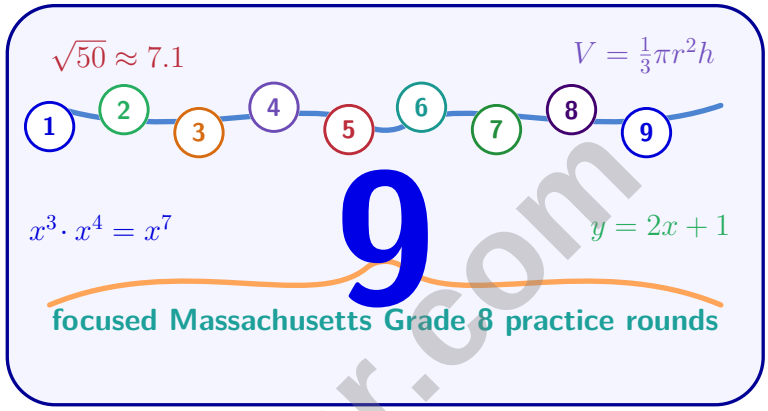
9 PRINTED TESTS

2 ONLINE TESTS

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

9 Massachusetts MCAS Grade 8 Math Practice Tests

Massachusetts Math Readiness for Exponents, Systems, Functions, Geometry, and Statistics



Nine 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!

Nine focused rounds for sharper MCAS math thinking

This book gives you nine 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.

How to Use This Book

A nine-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?

Nine MCAS tests, 360 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 7–9	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.

Table of Contents

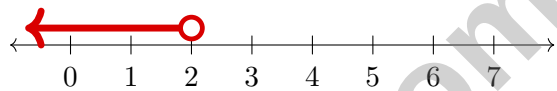
1) A museum's skylight is a square pyramid frame with a base side of 5 m and height 3 m. What is the volume of air enclosed by this pyramidal structure?

☐ A. 15 m^3
☐ B. 25 m^3
☐ C. 75 m^3
☐ D. 225 m^3

2) The equation $2x - y = 4$ can be rewritten in slope-intercept form as:

☐ A. $y = 2x - 4$
☐ B. $y = -2x - 4$
☐ C. $y = 2x + 4$
☐ D. $y = x - 2$

3) Which inequality has the solution graphed below?



☐ A. $x < 2$
☐ B. $x > 2$
☐ C. $x \leq 2$
☐ D. $x \geq 2$

4) Which graph represents $y < 2x + 1$?

☐ A. A dashed line $y = 2x + 1$ with shading above
☐ B. A solid line $y = 2x+1$ with shading below
☐ C. A dashed line $y = 2x + 1$ with shading below
☐ D. A solid line $y = 2x+1$ with shading above

5) The mass of the Sun is approximately 2×10^{30} kg. How many times more massive is the Sun than Earth, which has mass 6×10^{24} kg?

6) A point P is at $(5, 3)$. After a translation of $(-2, 4)$, the point moves to P'. What is the distance from P to P'?

☐ A. $\sqrt{5}$ units
☐ B. $\sqrt{20}$ units
☐ C. 6 units
☐ D. $\sqrt{45}$ units

7) Which is the best estimate of $3 - \sqrt{2}$?

☐ A. 0.6
☐ B. 4.4
☐ C. 2.0
☐ D. 1.6

8) A payday loan charges \$15 for every \$100 borrowed for 2 weeks. What is the APR equivalent?

☐ A. 15%
☐ B. 30%
☐ C. 390%
☐ D. 780%

9) Match the expression to the exponent law it uses:

Expression	Law
$x^5 \cdot x^3 = x^8$	Product rule (add)

Which expression uses the quotient rule?

☐ A. $a^2 \cdot a^4 = a^6$
☐ B. $(y^2)^5 = y^{10}$
☐ C. $(2b)^3 = 8b^3$
☐ D. $\frac{m^9}{m^3} = m^6$

10) Divide: $\frac{8\times10^8}{2\times10^3}$

☐ A. 10×10^5
☐ B. 6×10^5
☐ C. 4×10^{11}
☐ D. 4×10^5

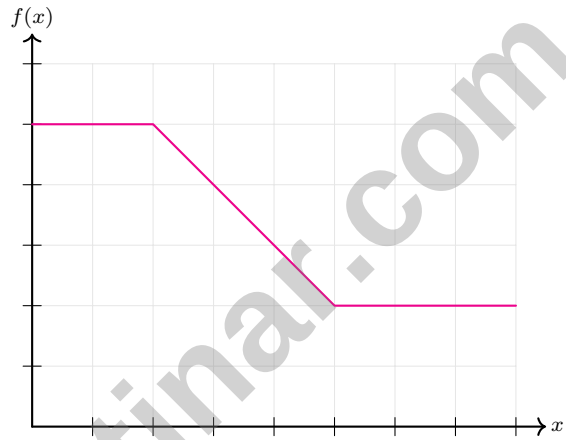
11) What is the solution to $6(x+2)=30$?

☐ A. $x=3$
☐ B. $x=5$
☐ C. $x=8$
☐ D. $x=-2$

12) The function $y=\sqrt{x-1}$ is LINEAR or NONLINEAR?

☐ A. Linear, because it has a constant slope
☐ B. Nonlinear, because $x \geq 1$
☐ C. Linear, because x appears once
☐ D. Nonlinear, because it contains a square root

13)



Over the interval $[0,3]$, is the function increasing, decreasing, or constant?

☐ A. Constant
☐ B. Both increasing and constant
☐ C. Increasing
☐ D. Decreasing

14) Polygon ABCD is translated 4 units left and 3 units down to form polygon A'B'C'D'. If angle A measures 85°, what is the measure of angle A'?

☐ A. 42.5°
☐ B. 75°
☐ C. 85°
☐ D. 95°

1) A square pyramid has a base with side length 8 cm and height 3 cm. Approximate the slant height and then calculate the surface area. (Use $\sqrt{25} = 5$.)

☐ A. Slant height ≈ 5 cm, SA ≈ 129 cm^2
☐ B. Slant height ≈ 5 cm, SA ≈ 144 cm^2
☐ C. Slant height ≈ 4 cm, SA ≈ 113 cm^2
☐ D. Slant height ≈ 6 cm, SA ≈ 161 cm^2

2) In a two-way table of 500 voters by income and voting choice:

	Yes	No	Total
High Income	150	100	250
Low Income	120	130	250
Total	270	230	500

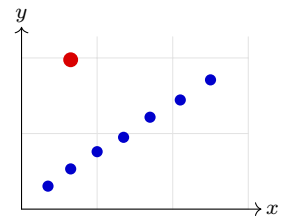
A student claims: "Since both income groups total 250, there is no association." Is this reasoning correct?

☐ A. Yes; equal row totals guarantee independence.
☐ B. No; equal row totals don't ensure equal conditional frequencies.
☐ C. Yes; balancing the sample sizes shows no bias.
☐ D. No; we must check the yes vote totals, which differ.

3) A student claims the sum of interior angles of a nonagon is 1260°. Is this correct?

☐ A. Yes, 1260° is correct.
☐ B. No, it is 1080°.
☐ C. No, it is 1440°.
☐ D. No, it is 1620°.

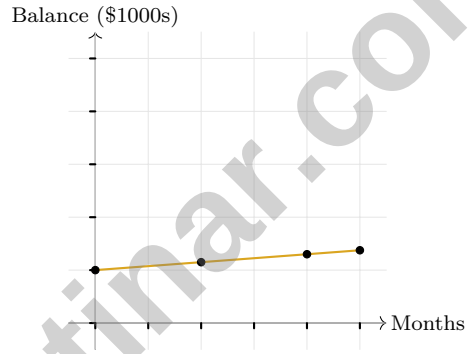
4)



A scatter plot displays student class attendance versus final exam grade. The data shows a positive linear association with a strong correlation. One student attended class 80% of the time but scored a 40% on the exam. This point is:

☐ A. An outlier
☐ B. A typical data point
☐ C. The mean of the data
☐ D. An error in measurement

5)



A savings account grows according to $A = 1000 + 75m$, where A is account balance and m is months. How much does the account grow each month?

☐ A. $75
☐ B. $1000
☐ C. $75m$
☐ D. Varies each month

1) How many ways can a teacher select and arrange 3 students from a class of 8 to sit in the front row?

☐ A. $\binom{8}{3} = 56$
☐ B. $8 \times 7 \times 6 = 336$
☐ C. $8^3 = 512$
☐ D. $8! = 40{,}320$

2) Simplify $\dfrac{x^{10} \cdot x^{-3}}{x^4}$. What is the exponent on x in the final answer?

3) Expand $(x-3)^2$.

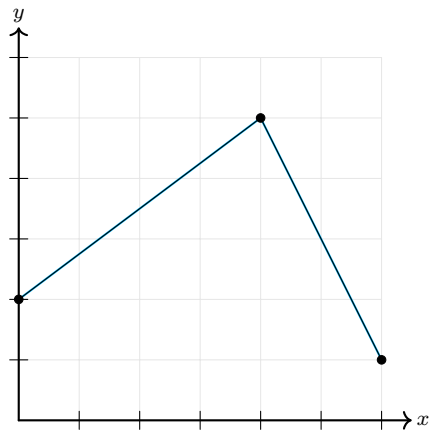
☐ A. $x^2 - 6x + 9$
☐ B. $x^2 - 9$
☐ C. $x^2 + 6x + 9$
☐ D. $x^2 - 6x - 9$

4) Which table represents a LINEAR function?

x	1	2	3	4
y	3	7	11	15

☐ A. Yes, the first differences are constant
☐ B. No, the y-values are not all even
☐ C. Yes, all y-values are positive
☐ D. No, the x-values increase

5)



Which set of statements is true about the piecewise linear function?

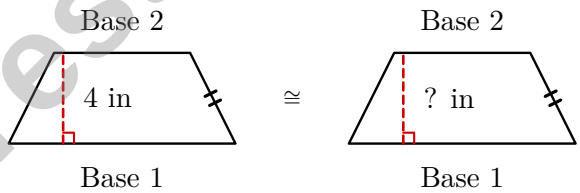
☐ A. It increases from $x = 0$ to $x = 4$, decreases from $x = 4$ to $x = 6$, and has maximum value 5

☐ B. It has a zero at $x = 3$, decreases from $x = 4$ to $x = 6$, and has y-intercept 5

☐ C. It increases from $x = 0$ to $x = 6$, has maximum value 6, and has y-intercept 2

☐ D. It decreases from $x = 0$ to $x = 4$, has a zero at $x = 3$, and has maximum value 2

6) 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

☐ B. 4 inches

☐ C. 8 inches

☐ D. Cannot be determined

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.

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

1) **Choice B is correct.** 8.G.C.9 $V = \frac{1}{3} \times (5 \times 5) \times 3 = \frac{1}{3} \times 25 \times 3 = 25$ m^3.
2) **Choice A is correct.** 8.EE.B.6 Solve for y: $2x - y = 4 \Rightarrow -y = -2x + 4 \Rightarrow y = 2x - 4$.
3) **Choice A is correct.** 8.EE.C.7 The open circle at 2 means 2 is not included. The ray points left to smaller values, so $x < 2$.
4) **Choice C is correct.** 8.G.B.8 Strict inequality ($<$) means a DASHED boundary line. Because y is LESS than the expression, shade BELOW the line.
5) **The correct answer is** 3.33×10^5 **.** 8.EE.A.3 Divide: $\frac{2\times10^{30}}{6\times10^{24}} = \frac{2}{6} \times 10^6 = \frac{1}{3} \times 10^6 \approx 3.33 \times 10^5$.
6) **Choice B is correct.** 8.G.A.1 The translation vector is $(-2, 4)$, so the distance moved is the magnitude: $\sqrt{(-2)^2 + 4^2} = \sqrt{4 + 16} = \sqrt{20} = 2\sqrt{5}$ units.
7) **Choice D is correct.** 8.NS.A.2 $\sqrt{2} \approx 1.41$, so $3 - 1.41 = 1.59 \approx 1.6$.
8) **Choice C is correct.** 8.G.B.7 Rate per 2 weeks: \$15 / \$100 = 15% per 2 weeks. There are 52 weeks / 2 = 26 two-week periods in a year. APR: $0.15 \times 26 = 3.9 = 390\%$.
9) **Choice D is correct.** 8.EE.A.1 Quotient rule subtracts exponents: $\frac{m^9}{m^3} = m^{9-3} = m^6$. (A) is product, (B) is power of power, (C) is power of product.
10) **Choice D is correct.** 8.EE.A.4 Divide coefficients: $8 \div 2 = 4$. Subtract exponents: $10^{8-3} = 10^5$. Result: 4×10^5.
11) **Choice A is correct.** 8.EE.C.7 Distribute: $6x + 12 = 30$. Subtract 12: $6x = 18$. Divide by 6: $x = 3$.
12) **Choice D is correct.** 8.F.A.3 The presence of a square root makes this function nonlinear. Linear functions can only have x to the first power and no radicals.
13) **Choice D is correct.** 8.F.B.5 From $x = 0$ to $x = 3$, the function values drop from 5 to 2, so the function is decreasing over this interval.
14) **Choice C is correct.** 8.G.A.2 Translation is a rigid motion that preserves all angles. Since polygon A'B'C'D' is congruent to ABCD, angle A' = angle A = 85°.
15) **Choice A is correct.** 8.G.A.5 Alternate exterior angles are congruent when lines are parallel.
16) **Choice A is correct.** 8.G.B.8 Correct method: $d = \sqrt{(3-0)^2 + (0-4)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$ units. The student used addition instead of the Pythagorean Theorem.
17) **Choice A is correct.** 8.EE.A.2 Check each: A is correct. B: $\sqrt{64} = 8 \neq 7$. C: $\sqrt{100} = 10 \neq 5$. D: $\sqrt[3]{64} = 4 \neq 8$.
18) **Choice D is correct.** 8.EE.B.5 Unit rate: $\frac{8}{10} = 0.8$ oz per minute. After 45 minutes: $0.8 \times 45 = 36$ ounces.
19) **Choice A is correct.** 8.EE.C These lines have the same slope ($\frac{1}{2}$) but different y-intercepts (1 and -3), making them parallel with no intersection.
20) **The correct answer is A,B.** 8.G.C.9 Cylinder $V = 3.14 \times 9 \times 7 = 197.82$ cm^3 (A correct); Cone $V = \frac{1}{3} \times 3.14 \times 9 \times 7 = 65.94$ cm^3 (B correct). C is wrong (incorrect cylinder volume), D is wrong (that's the cylinder volume), E is wrong (cone is $\frac{1}{3}$ cylinder).
21) **Choice B is correct.** 8.EE.C.7 These two numbers multiply to -12 and add to 1 (the middle coefficient). So $x^2 + x - 12 = (x - 3)(x + 4)$.
22) **Choice A is correct.** 8.F.A.1 Graph A is one nonvertical straight line, so it is a linear function. Graph B is a function but not linear. Graph C is made of two separate segments, not one single linear function. Graph D is a vertical line segment, so it is not a function.
23) **Choice A is correct.** 8.F.A.2 Rate $= (1 - 3)/(1 - 0) = -2/1 = -2$. A quick check with the next two points gives $(-1 - 1)/(2 - 1) = -2$ again, so the rate is consistent.
24) **The correct answer is** 12 **.** 8.NS.A.1 Since $12 \times 12 = 144$, $\sqrt{144} = 12$.
25) **The correct answer is** $\frac{2}{9}$ **.** 8.NS.A.1 Set $x = 0.\overline{2}$, so $10x = 2.\overline{2}$. Subtracting: $10x - x = 2$, giving $9x = 2$ and $x = \frac{2}{9}$.
26) **Choice A is correct.** 8.F.B.4 Initial length is 10 cm (when $w = 0$). Change from 2 to 4 weights: length goes from 14 to 18 cm, a change of 4 cm for 2 weights, so slope is 2. Equation: $L = 2w + 10$.

Author's Note

A Page for Persistence

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 9 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

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE 8

Help your child excel in math with **9 full-length Grade 8 practice tests** designed to reflect real test formats and cover all key math standards. With a wide variety of questions and real-world applications, this book builds the skills and confidence students need to achieve their best!

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

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- Linear Equations
- Functions
- Geometry
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2 Extra Online Practice Tests Included!

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PRACTICE. PREPARE. SUCCEED.

Testinar | More Practice. More Confidence. Better Results.