

Massachusetts

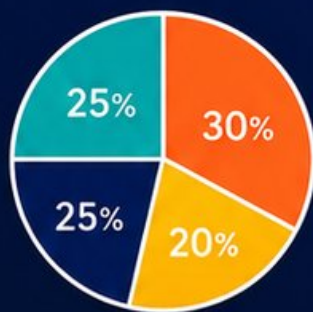
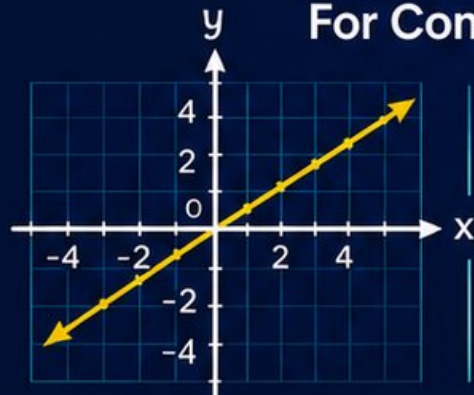
MCAS

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

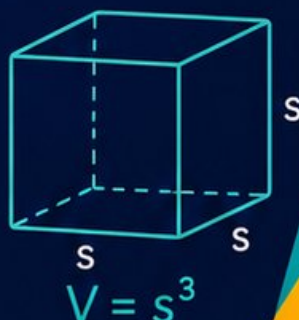


$$y = mx + b$$

$$2x - 3y = 6$$

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

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS

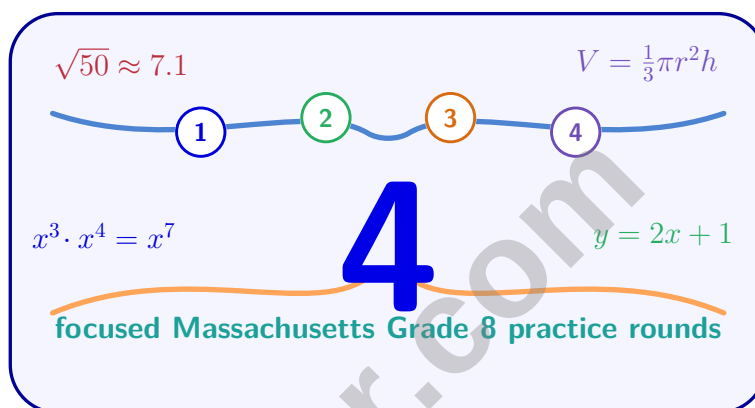


Use these **two additional online practice tests** for extra review after the printed tests in this book.



4 Massachusetts MCAS Grade 8 Math Practice Tests

Compact MCAS Prep for Functions, Transformations, Geometry, and Data



Four 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!

Four focused rounds for sharper MCAS math thinking

This book gives you four 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 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.

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?

Four MCAS 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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1) Does the relation $\{(5, 10), (5, 15), (6, 12)\}$ represent a function?

- ☐ A. Yes, because all y -values are positive.
- ☐ B. No, because 5 is paired with two different outputs.
- ☐ C. Yes, because there are three ordered pairs.
- ☐ D. No, because 10 and 15 are both outputs.

2) 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
- ☐ B. 150
- ☐ C. 50
- ☐ D. 120

3) A car depreciates \$2000 per year. It is worth \$18,000 now. Which equation gives its value V after t years?

- ☐ A. $V = 2000t + 18000$
- ☐ B. $V = -2000t + 18000$
- ☐ C. $V = 18000t - 2000$
- ☐ D. $V = 18000 - t$

4) A 270° counterclockwise rotation about the origin is applied to the point $(4, -3)$. What is the image?

- ☐ A. $(-3, -4)$
- ☐ B. $(3, 4)$
- ☐ C. $(-4, 3)$
- ☐ D. $(4, 3)$

5) A right triangle has legs of 7 and 24. What is the hypotenuse?

- ☐ A. 17
- ☐ B. 20
- ☐ C. 25
- ☐ D. 31



6) A data set has a linear relationship modeled by the line $y = 0.5x + 10$. Which point lies exactly on the trend line?

☐ A. (2, 10)

☐ C. (6, 12)

☐ B. (8, 15)

☐ D. (4, 12)

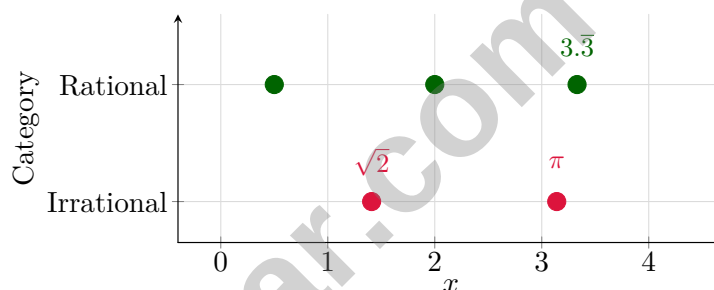
7) Triangle ABC is similar to Triangle DEF . Side $AB = 4$ cm, $BC = 5$ cm, $CA = 6$ cm. The perimeter of DEF is 45 cm. Find the length of EF .

☐ A. 15 cm

☐ C. 22.5 cm

☐ B. 18 cm

☐ D. 10 cm



8)

Which number should be plotted as irrational (height 0)?

☐ A. 0.5

☐ C. $3.\bar{3}$

☐ B. 2

☐ D. $\sqrt{5}$

n	4	9	16	25
$\sqrt{n}$	2	3	4	5

9)

Using the table, between which integers does $\sqrt{11}$ lie?

☐ A. 2 and 3

☐ C. 4 and 5

☐ B. 5 and 6

☐ D. 3 and 4



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10) Which is the best estimate of $\pi - \sqrt{2}$?

☐ A. 0.8

☐ C. 1.7

☐ B. 1.2

☐ D. 2.4

11) The speed of light is about 3×10^8 m/s. How many times faster is this than the speed of sound, which is 3.4×10^2 m/s?

☐ A. Approximately 880 times

☐ C. Approximately 88,000 times

☐ B. Approximately 8,800 times

☐ D. Approximately 880,000 times

12)
$$\begin{array}{rcl} x & = & 0.3\overline{7} \\ 10x & = & ? \\ 100x & = & ? \end{array} \qquad \begin{array}{rcl} 3.\overline{7} \\ 37.\overline{7} \end{array}$$

Using the diagram, what is $100x - 10x$?

☐ A. $34.\overline{0}$

☐ C. 33

☐ B. 37

☐ D. 34

13) A line passes through $(0, 2)$ and $(4, 10)$. Find the slope.

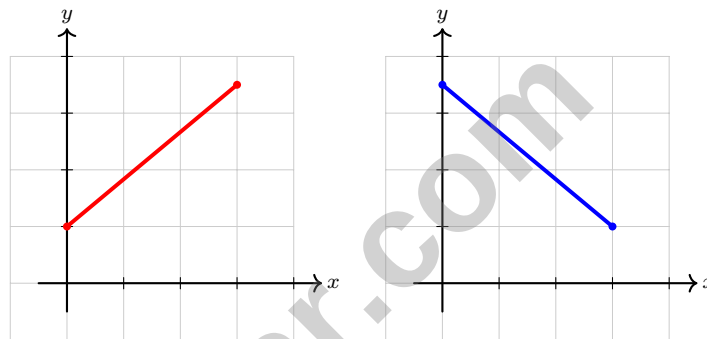
14) Function $f(x) = 2x + 3$ and another through $(0, 1)$ and $(2, 7)$. Difference in slopes?



1) A teacher plots the relationship between attendance and test scores. The trend line shows a positive slope. What does this tell you?

- ☐ A. Attendance directly causes higher test scores
- ☐ B. All students with perfect attendance pass the test
- ☐ C. Test scores determine how often students attend
- ☐ D. As attendance increases, test scores tend to increase on average

2) Which graph represents a positive slope?



- ☐ A. Red line (left)
- ☐ B. Blue line (right)
- ☐ C. Both have positive slope
- ☐ D. Neither has positive slope
- 3) A trapezoid has a top base of 5 cm, a bottom base of 9 cm, and two equal legs. If the perimeter is 30 cm, what is the length of each leg?
- ☐ A. 6 cm
- ☐ B. 7 cm
- ☐ C. 8 cm
- ☐ D. 9 cm



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- 4) A savings account has $S(n) = 50 + 10n$ dollars after n weeks. After how many weeks will the account have \$150?

☐ A. 5 weeks ☐ C. 15 weeks
☐ B. 10 weeks ☐ D. 20 weeks

- 5) A regular pentagon has all interior angles equal. If one interior angle is 108° , what is the sum of all five interior angles? Show your work.

6)

	M	F
Soccer	8	6
Tennis	5	7

The table shows the number of boys (M) and girls (F) who play soccer and tennis. If one student is selected at random, what is the probability that they play tennis?

☐ A. $\frac{6}{26}$ ☐ C. $\frac{14}{26}$
☐ B. $\frac{5}{26}$ ☐ D. $\frac{12}{26}$

- 7) There are 5 ways to get from building A to building B, and 3 ways to get from B to C. A student writes: "Total routes = $5 + 3 = 8$." Which statement best describes the error?

☐ A. The student is correct; addition is the right operation. ☐ C. The student should use factorials: $5! + 3! = 126$.
☐ B. The student should multiply because each A-to-B route can be followed by any B-to-C route. ☐ D. The student should use combinations: $\binom{5}{3} = 10$.



- 1) A fitness gym charges only a flat \$50 monthly fee with no additional per-visit costs. If C is total monthly cost and m is the number of months, which equation represents this?

☐ A. $C = m + 50$

☐ C. $C = 50$

☐ B. $C = 50m$

☐ D. $C = m^2$

- 2) Which of the following is a real-world function?

☐ A. A person and every address they have lived at.☐ C. A person and the cars they have ever owned.☐ B. A student's student ID and their grade in math class.☐ D. A website URL and every person who has visited it.

- 3) A bicycle rental costs \$5 base fee plus \$3 per hour. If the relationship is graphed with hours on the x -axis and cost on the y -axis, what is the slope?

☐ A. $\frac{3}{5}$

☐ C. 3

☐ B. 8

☐ D. 5

- 4) A restaurant has 50 tables. Small tables seat 2 people; large tables seat 4 people. To seat at least 160 people, how many large tables are needed at minimum?

☐ A. 20

☐ C. 30

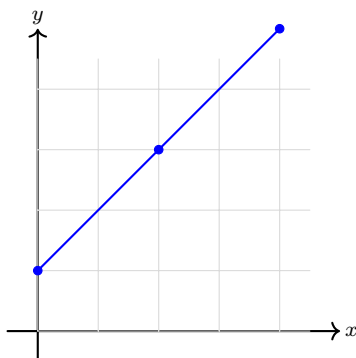
☐ B. 25

☐ D. 35

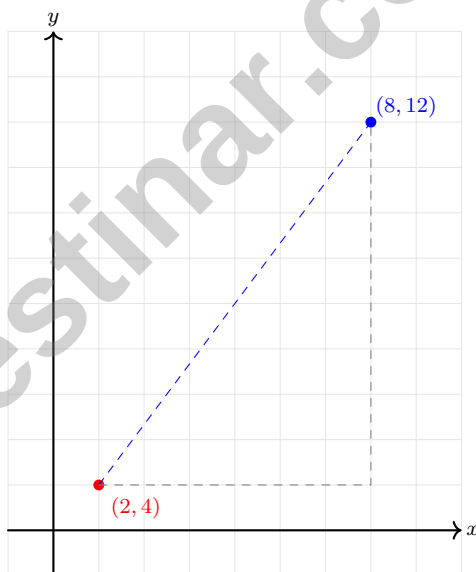


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5) The graph shows function g . What is $g(2)$?

☐ A. 2☐ C. 1☐ B. 3☐ D. 4

6) Two points on a circle are at $(2, 4)$ and $(8, 12)$. What is the distance between them?

☐ A. 6☐ C. $\sqrt{90}$ ☐ B. 10☐ D. 8

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 B is correct.** (8.F.A.1) Input 5 maps to both 10 and 15, violating the definition of a function.
- 2) **Choice A is correct.** (8.G.C) Let c = children, a = adults. Then $c + a = 200$ and $4c + 7a = 1100$. Substitute $a = 200 - c$: $4c + 7(200 - c) = 1100$, so $-3c = -300$, $c = 100$.
- 3) **Choice B is correct.** (8.F.B.4) Current value \$18,000 (intercept). Depreciates (decreases) by \$2000 per year (negative slope). Equation: $V = -2000t + 18000$.
- 4) **Choice A is correct.** (8.G.A.3) The rule for 270° counterclockwise rotation is $(x, y) \rightarrow (y, -x)$. So $(4, -3) \rightarrow (-3, -4)$.
- 5) **Choice C is correct.** (8.G.B.6, 8.G.B.7) Using the Pythagorean Theorem: $7^2 + 24^2 = 49 + 576 = 625$, so $c = 25$ (the 7-24-25 triple).
- 6) **Choice D is correct.** (8.SP.A.2) Substituting $x = 4$: $y = 0.5(4) + 10 = 2 + 10 = 12$. Point $(4, 12)$ is on the line.
- 7) **Choice A is correct.** (8.G.A.4) Perimeter of ABC is $4 + 5 + 6 = 15$ cm. Scale factor is $\frac{45}{15} = 3$. The side corresponding to $BC = 5$ is $EF = 5 \times 3 = 15$ cm.
- 8) **Choice D is correct.** (8.NS.A.1) Only $\sqrt{5}$ is irrational (a square root of a non-perfect square). The others are rational: $0.5 = \frac{1}{2}$, 2 is an integer, and $3.\bar{3} = \frac{10}{3}$.
- 9) **Choice D is correct.** (8.NS.A.2) From the table, $3^2 = 9$ and $4^2 = 16$. Since $9 < 11 < 16$, we have $3 < \sqrt{11} < 4$.
- 10) **Choice C is correct.** (8.NS.A.2) $\pi \approx 3.14$ and $\sqrt{2} \approx 1.41$, so $3.14 - 1.41 \approx 1.73$.
- 11) **Choice D is correct.** (8.EE.A.3) Divide: $\frac{3 \times 10^8}{3.4 \times 10^2} = \frac{3}{3.4} \times 10^6 \approx 0.88 \times 10^6 = 8.8 \times 10^5 \approx 880,000$.
- 12) **Choice D is correct.** (8.NS.A.1) $100x - 10x = 37.\bar{7} - 3.\bar{7} = 34$. The repeating parts cancel, leaving $90x = 34$.
- 13) **The correct answer is 2.** (8.EE.B.5) Slope = $\frac{10 - 2}{4 - 0} = \frac{8}{4} = 2$.
- 14) **The correct answer is 1.** (8.F.A.2) Slope of f : 2. Other slope: $(7 - 1)/2 = 3$. Difference: $3 - 2 = 1$.
- 15) **The correct answer is $\frac{1}{2}$.** (8.G.B.7) Sample space: HH, HT, TH, TT. Exactly one heads: HT, TH. That's 2 of 4. $P = \frac{1}{2}$.
- 16) **Choice D is correct.** (8.G.C.9) Two triangular bases: $2 \times \frac{1}{2}(3)(4) = 12 \text{ cm}^2$. Three rectangular sides: $7(3 + 4 + 5) = 84 \text{ cm}^2$. Total surface area = $12 + 84 = 96 \text{ cm}^2$.
- 17) **Choice D is correct.** (8.G.A.1) Translations, reflections, and rotations (and their compositions) are rigid transformations that preserve both distance and angle. Dilations multiply all distances by a scale factor, changing size.
- 18) **Choice A is correct.** (8.EE.B.6) Using $(1, 4)$ and $(5, 2)$: slope = $\frac{2 - 4}{5 - 1} = -\frac{1}{2}$. Substituting: $4 = -\frac{1}{2}(1) + b$ gives $b = \frac{9}{2}$.
- 19) **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.
- 20) **Choice A is correct.** (8.EE.C.7) Multiply by 2: $y - 3 = 10$. Add 3: $y = 13$.
- 21) **Choice D is correct.** (8.EE.C.7) Distribute: $6 - 2x \geq 4$. Subtract 6: $-2x \geq -2$. Divide by -2 (FLIP): $x \leq 1$.
- 22) **Choice A is correct.** (8.G.B.8) The line is $x - 2y = 6$. Test origin: $0 - 0 = 0 \leq 6$ TRUE. So the origin is in the solution region with $\leq$.
- 23) **Choice A is correct.** (8.G.C.9) Since $V_{\text{cone}} = \frac{1}{3}V_{\text{cyl}}$, the cone's volume is $\frac{1}{3} \times 450 = 150 \text{ m}^3$.
- 24) **Choice B is correct.** (8.SP.A.3) The magnitude (absolute value) of the residual tells us the size of the error. Model 2's error of 5 units is larger than Model 1's error of 2 units, regardless of whether the prediction was too high or too low.
- 25) **Choice D is correct.** (8.G.B.7) Interest: $I = 25000 \times 0.06 \times 5 = \$7,500$. Total: $25000 + 7500 = \$32,500$.
- 26) **Choice C is correct.** (8.EE.A.1) The diagram shows the product rule (add exponents). (C) uses it: $2^{4+5} = 2^9$. (A) is power of product, (B) is quotient rule, (D) is power of power.
- 27) **Choice D is correct.** (8.EE.A.2) $17 \times 17 = 289$, so $\sqrt{289} = 17$.
- 28) **Choice D is correct.** (8.EE.A.4) Multiply the coefficients and add the exponents: $(3 \times 2) \times 10^{4+5} = 6 \times 10^9$.
- 29) **Choice C is correct.** (8.EE.B.5) Unit rate $k = \frac{110}{2} = 55$ miles per hour. The proportional equation is $d = 55t$.



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One Last Encouragement

Hi, Determined Student!

◇ You did meaningful Grade 8 practice. That matters because confidence is built through action, not waiting until everything feels easy. This carefully paced book gave you four steady Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** Carry this with you: you can learn hard things by breaking them into steps, asking good questions, and reviewing with honesty. ★

Take This With You

- **You Can Start:** Even when the problem looks big.
- **You Can Adjust:** When the first method is not enough.
- **You Can Learn:** From every corrected mistake.
- **You Can Improve:** One practice session at a time.

Grade 8 test-day tip: Walk into test day ready to think, not ready to be perfect. Thinking clearly is the goal.

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!



4 PRINTED TESTS

+



2 ONLINE TESTS



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