

Minnesota

MCA III

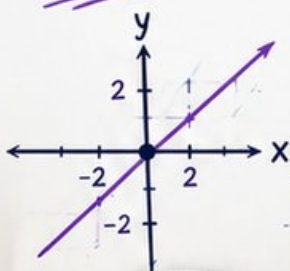
GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

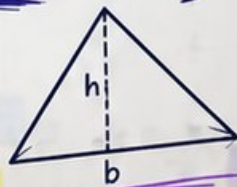
$$y = mx + b$$



**BUILD
CONFIDENCE.
SHARPEN SKILLS.
ACE YOUR
EXAM!**

Practice
Today
Succeed
Tomorrow!

$$A = \frac{1}{2}bh$$



7 PRINTED
TESTS



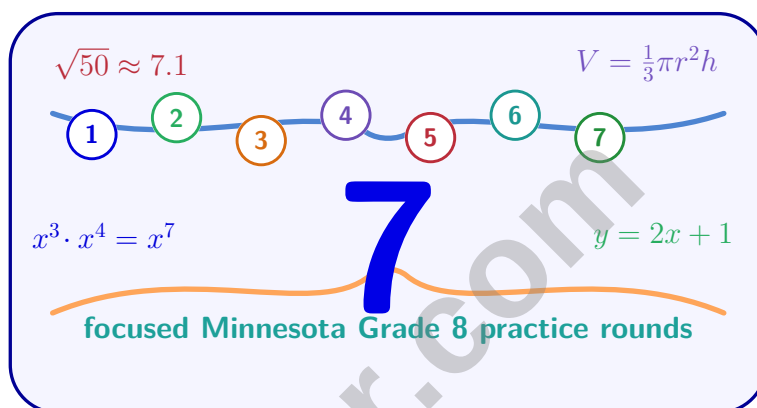
2 ONLINE
TESTS



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

7 Minnesota MCA III Grade 8 Math Practice Tests

Seven MCA III Rounds for Algebraic Reasoning and Geometry Review



Seven complete 40-question Grade 8 MCA III 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, Minnesota Grade 8 Problem Solver!

Seven focused rounds for sharper MCA III math thinking

This book gives you seven full Grade 8 MCA III 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 Minnesota 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 seven-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.

Minnesota 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?

Seven MCA III tests, 280 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.
Test 7	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.



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& answers

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1) A pyramid has a base area of 75 ft^2 and a volume of 500 ft^3 . What is its height?

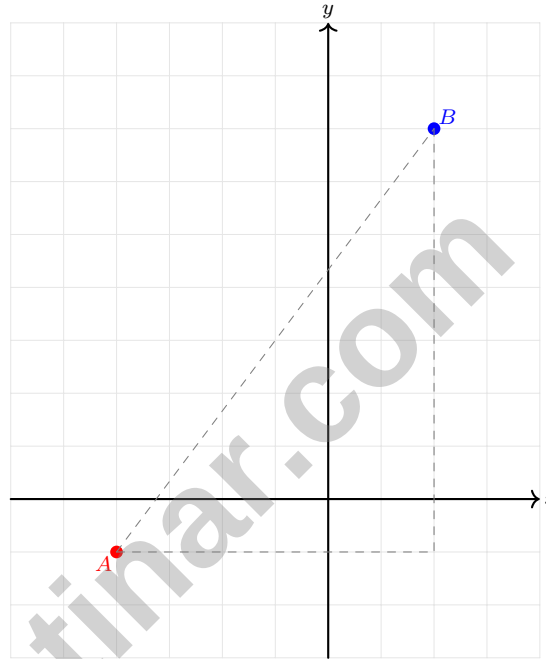
☐ A. 5 ft

☐ C. 15 ft

☐ B. 10 ft

☐ D. 20 ft

2) What is the distance between $(-4, -1)$ and $(2, 7)$?



☐ A. 10

☐ C. $\sqrt{90}$

☐ B. 8

☐ D. 6

3) Which system has infinitely many solutions?

☐ A. $y = x + 2$ and $y = x - 2$

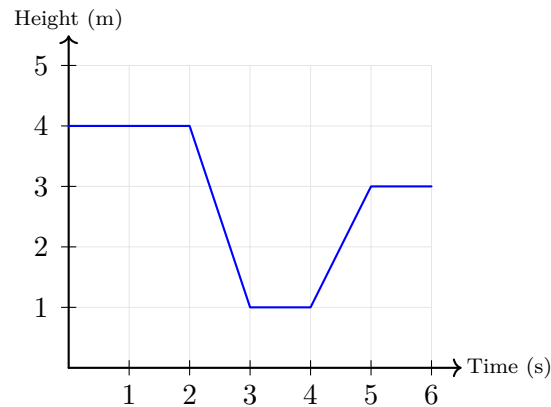
☐ C. $y = x + 2$ and $y = -x + 2$

☐ B. $y = x + 2$ and $y = 2x + 2$

☐ D. $y = x + 2$ and $2y = 2x + 4$



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4)

A toy platform follows the height-time graph shown. Which description is accurate?

- | | |
|--|---|
| ☐ A. The object goes up constantly, then down, then flat | ☐ C. The object increases, then decreases throughout |
| ☐ B. The object stays level, drops, stays level, rises, stays level | ☐ D. The object decreases in height initially |

5) What is the sum of the interior angles of a hexagon?

- | | |
|---|---|
| ☐ A. 900° | ☐ C. 360° |
| ☐ B. 540° | ☐ D. 720° |

6) Which pair of figures is NOT similar?

- | | |
|--|---|
| ☐ A. Two circles with radii 3 and 6 | ☐ C. A rectangle 2×4 and a rectangle 3×6 |
| ☐ B. A 3-4-5 triangle and a 6-8-10 triangle | ☐ D. A square 5×5 and a rectangle 5×10 |



7) For $-x + 2y > 4$, after rewriting to slope-intercept form $y > \frac{1}{2}x + 2$, which description matches the graph?

- ☐ A. Dashed line, shade above ☐ C. Solid line, shade above
☐ B. Dashed line, shade below ☐ D. Solid line, shade below

8) What is the domain of the relation $\{(1, 2), (3, 4), (5, 6), (7, 8)\}$?

- ☐ A. $\{2, 4, 6, 8\}$ ☐ C. $\{1, 2, 3, 4, 5, 6, 7, 8\}$
☐ B. $\{1, 3, 5, 7\}$ ☐ D. $\{3, 6, 9, 12\}$

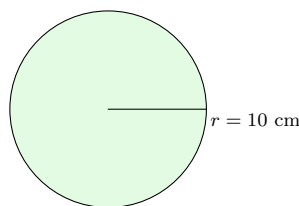
9) Which statement best explains why the table represents a linear function?

x	-2	-1	0	1
y	-5	-2	1	4

- ☐ A. The first differences are constant (3) ☐ C. The y -values are all positive
☐ B. The equation is $y = x + 3$ ☐ D. It is nonlinear because x includes negative values

10) Which triangle is NOT a right triangle?

- ☐ A. sides 5, 12, 13 ☐ C. sides 8, 15, 17
☐ B. sides 3, 4, 5 ☐ D. sides 7, 8, 9



11)

A sphere with radius 10 cm is shown. Approximately, what is its volume? (Use $\pi \approx 3.14$.)

- ☐ A. 4186.67 cm^3 ☐ C. 1046.67 cm^3
☐ B. 2093.33 cm^3 ☐ D. 6280 cm^3



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1) Which system below can be solved by the elimination shown: adding the two equations to eliminate y ?

☐ A. $3x + y = 10$ and $2x + y = 7$

☐ C. $x - 2y = 3$ and $2x + y = 5$

☐ B. $4x + 3y = 12$ and $2x - 3y = 6$

☐ D. $5x + 2y = 11$ and $3x + y = 6$

2) 3.2×10^{-3} equals:

☐ A. 3,200

☐ C. 0.0032

☐ B. 0.032

☐ D. 3.2

3) The points $(-2, -5)$, $(0, -1)$, and $(2, 3)$ lie on the same line. What is the y -intercept?

☐ A. -5

☐ C. -1

☐ B. -2

☐ D. 2

4) A savings goal is to have more than \$500. Currently you have \$150 and save \$25 per week. Which inequality describes the number of weeks needed to exceed the goal?

☐ A. $w \geq 14$

☐ C. $w \leq 14$

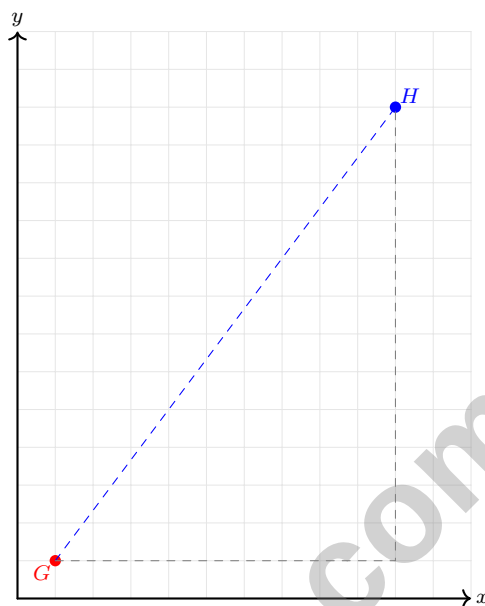
☐ B. $w < 14$

☐ D. $w > 14$



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- 5) Points are plotted at $G = (1, 1)$ and $H = (10, 13)$. What is the distance between G and H rounded to the nearest whole number?

☐ A. 12☐ C. 21☐ B. 15☐ D. 18

1) When rolling two dice, what is the probability of rolling a sum of 10 or higher?

- ☐ A. $\frac{1}{12}$
☐ B. $\frac{5}{36}$

- ☐ C. $\frac{6}{36}$
☐ D. $\frac{7}{36}$

2) A segment has endpoints at $G(2, 5)$ and $H(8, 5)$. The segment is reflected across the line $y = x$. What is the length of the reflected segment $G'H'$?

3)

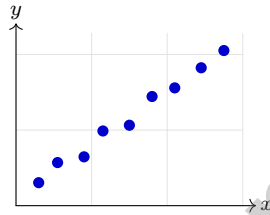
Value	4	8	12
Freq.	2	3	5

Frequency table: mean = 9.2. Calculate MAD.

- ☐ A. 2.0 (forgot to weight by frequency) ☐ D. 4.2 (summed deviations without dividing by n)
☐ B. 2.8
☐ C. 3.4 (used unweighted average of deviations)
- 4) A car manufacturer offers 3 body styles, 5 paint colors, 4 interior designs, and 2 engine options. How many different car configurations are possible?
- ☐ A. $3 + 5 + 4 + 2 = 14$ ☐ C. $(3 + 5 + 4 + 2)^2 = 196$
☐ B. $3 \times 5 \times 4 \times 2 = 120$ ☐ D. $5^4 = 625$



- 5) Two parallel lines are cut by a transversal. If a co-interior angle pair measures $(7a + 5)^\circ$ and $(2a + 85)^\circ$, find the value of a .



6)

A scatter plot shows study hours (x-axis) versus test scores (y-axis) for 20 students. The points form an upward trend with some scatter. What type of correlation is shown?

- 7) Which pair of irrational numbers, when multiplied, produces a rational number?

☐ A. $\sqrt{3} \times \sqrt{5}$

☐ C. $\sqrt{6} \times \sqrt{10}$

☐ B. $\sqrt{7} \times \sqrt{11}$

☐ D. $\sqrt{2} \times \sqrt{8}$



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Minnesota MCA III 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 Minnesota MCA III practice test.

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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.3.2.1) $500 = \frac{1}{3} \times 75 \times h \Rightarrow h = \frac{500 \times 3}{75} = \frac{1500}{75} = 20$ ft.
- 2) **Choice A is correct.** (8.3.1.2) $d = \sqrt{(2 - (-4))^2 + (7 - (-1))^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
- 3) **Choice D is correct.** (8.2.4.7) Simplify the second equation: $2y = 2x + 4$ becomes $y = x + 2$, the same as the first equation. They represent the same line, so they intersect at infinitely many points.
- 4) **Choice B is correct.** (8.2.2.4) From 0 to 2s: flat (height constant at 4m). From 2 to 3s: the height drops to 1m. From 3 to 4s: flat at 1m. From 4 to 5s: the height rises to 3m. From 5 to 6s: flat at 3m.
- 5) **Choice D is correct.** (8.3.2.2) The sum of interior angles of an n -gon is $(n-2) \times 180^\circ$. For a hexagon, $(6-2) \times 180 = 720^\circ$.
- 6) **Choice D is correct.** (8.3.2.3) The square has aspect ratio 1 : 1 while the rectangle has aspect ratio 1 : 2. Different aspect ratios mean they are not similar.
- 7) **Choice A is correct.** (8.3.1.2) The $>$ symbol (strict) gives a DASHED line. Since y is GREATER than the expression, shade ABOVE.
- 8) **Choice B is correct.** (8.2.1.1) The domain is the set of all inputs (x -coordinates). From the pairs, the inputs are 1, 3, 5, 7.
- 9) **Choice A is correct.** (8.2.2.2) The y -values increase by 3 each time x increases by 1: $-2 - (-5) = 3$, $1 - (-2) = 3$, and $4 - 1 = 3$. Constant first differences show the table represents a linear function.
- 10) **Choice D is correct.** (8.3.1.1) Check option D: $7^2 + 8^2 = 49 + 64 = 113 \neq 81 = 9^2$. The other options are all known Pythagorean triples.
- 11) **Choice A is correct.** (8.3.2.1) $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 1000 = 4186.67 \text{ cm}^3$.
- 12) **Choice A is correct.** (8.3.2.1) Let the smaller angle be x . Then $3x + x = 90$, so $4x = 90$ and $x = 22.5^\circ$.
- 13) **The correct answer is 12.** (8.2.2.2) Set $x = 0$: $3(0) + y = 12$, so $y = 12$. Alternatively, solve for y : $y = -3x + 12$, so $b = 12$.
- 14) **Choice B is correct.** (8.4.1.2) Residual = actual - predicted = $35 - 32 = 3$. The model underestimated by 3 points.
- 15) **Choice D is correct.** (8.3.2.2) Rotation is a rigid motion that preserves shape and size. Rectangle M'N'O'P' is congruent to MNOP (same dimensions, though the length and width labels may have switched visually).
- 16) **Choice B is correct.** (8.3.2.2) The translation vector is $(4, 5) - (1, 2) = (3, 3)$. So $Q' = Q + (3, 3) = (4, 2) + (3, 3) = (7, 5)$.
- 17) **Choice A is correct.** (8.3.2.2) Using parallel line properties (alternate interior angles) and triangle angle sum: $35 + 55 + \angle PTS = 180$, so $\angle PTS = 90^\circ$.
- 18) **The correct answer is $t = 4$ months.** (8.2.4.2) The equation is $50t = 200$. Divide both sides by 50: $t = 4$ months. Verify: $50(4) = 200$ ✓.
- 19) **The correct answer is B,E.** (8.1.1.5) 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.
- 20) **Choice B is correct.** (8.3.1.1) Trapezoid area = $\frac{1}{2}(b_1 + b_2) \times h = \frac{1}{2}(8 + 12) \times 6 = \frac{1}{2} \times 20 \times 6 = 60 \text{ cm}^2$.
- 21) **Choice D is correct.** (8.4.1.1) Study method (alone vs. group) acts as a confounding variable, causing the data to split into two clusters at the same x -value but different y -values. This shows that the relationship is more complex than a single bivariate correlation.
- 22) **Choice B is correct.** (8.4.1.3) Row-conditional frequencies differ: high GPA (0.40 tutored) vs. low GPA (0.53 tutored). Different conditional frequencies within groups suggest an association. Option D uses raw counts instead of relative frequencies, which can be misleading.
- 23) **Choice A is correct.** (8.3.1.2) MAD = 0 only when every value equals the mean exactly.
- 24) **Choice B is correct.** (8.3.1) $P(\text{ace and ace}) = \frac{4}{52} \times \frac{4}{52} = \frac{16}{2704}$.
- 25) **Choice A is correct.** (8.3.2.2) Each letter has 26 choices and each digit has 10 choices. Multiply: $26 \times 26 \times 10 \times 10 \times 10 = 676,000$.
- 26) **Choice B is correct.** (8.4.1.2) Points nearly aligned on the line indicates high correlation, small residuals, and a strong linear model.



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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 broad and demanding book gave you seven strong 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 SUCCEED TOMORROW!

Give your child the confidence and skills they need with **7 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!

GRADE 8

Practice
Today
Succeed
Tomorrow!

Algebra

Geometry

Statistics

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

- | | |
|---------------------------------------|----------------------------|
| ✓ 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! |



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