

4

Minnesota

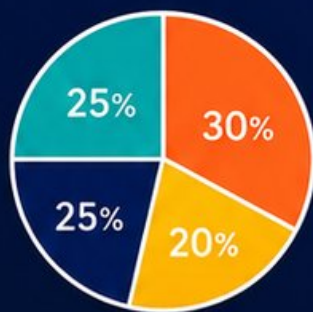
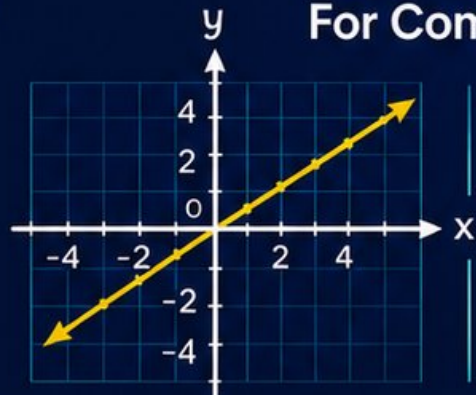
MCA III

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

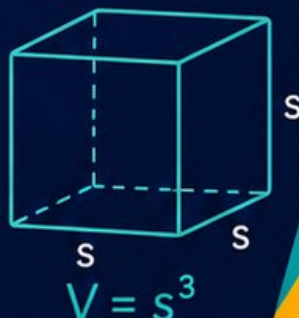


$$y = mx + b$$

$$2x - 3y = 6$$

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

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS

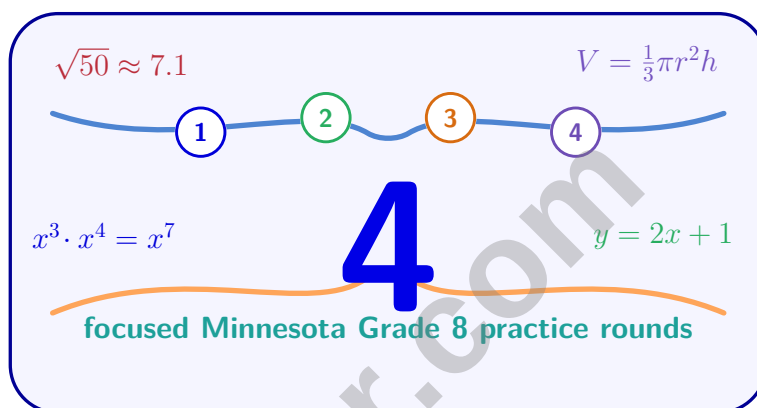


Use these **two additional online practice tests** for extra review after the printed tests in this book.



4 Minnesota MCA III Grade 8 Math Practice Tests

Standards-Based MCA III Practice for Confident Grade 8 Review



Four 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!

Four focused rounds for sharper MCA III math thinking

This book gives you four 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 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.

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?

Four MCA III 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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Table of Contents

★ Practice Test 1	_____	15
★ Practice Test 2	_____	31
★ Practice Test 3	_____	48
★ Practice Test 4	_____	62
Practice Test Answer Keys	_____	76
Practice Test Answers and Explanations	_____	79

- 1) Which equation represents a line with slope 4 and y -intercept 6?
- ☐ A. $y = 6x + 4$ ☐ C. $y = 4x - 6$
☐ B. $y = -4x + 6$ ☐ D. $y = 4x + 6$
- 2) A rope's length decreases at a constant rate. After 10 hours, it is 40 meters long. After 30 hours, it is 20 meters long. At what hour will the rope be 0 meters?
- ☐ A. 40 hours ☐ C. 60 hours
☐ B. 70 hours ☐ D. 50 hours
- 3) Two boats leave a dock at the same time, traveling in opposite directions. One boat travels at 20 mph and the other at 15 mph. In how many hours are they 105 miles apart?
- ☐ A. 2.5 hours ☐ C. 3 hours
☐ B. 4 hours ☐ D. 5 hours
- 4) Linear function same y at $x = 2$ and $x = 5$. Slope is?
- ☐ A. Positive ☐ C. Zero
☐ B. Negative ☐ D. Impossible
- 5) Which statement is true about the exterior angles of any convex polygon?
- ☐ A. Each exterior angle measures less than 90° . ☐ C. Exterior angles are always equal in any polygon.
☐ B. The sum of all exterior angles is always 360° . ☐ D. The sum depends on the number of sides.



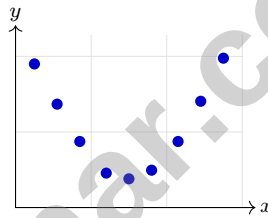
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6) A line of best fit for a data set is $y = 2x + 5$. What is the y -intercept, and what does it represent?

- ☐ A. The intercept is 2; it is the starting value ☐ C. The intercept is 7; it is the sum of slope and starting value
- ☐ B. The intercept is 5; it is the predicted value when $x = 0$ ☐ D. The intercept is $2x$; it is the slope

7) A triangle is dilated by a scale factor of 4. Which statement is true?

- ☐ A. Each angle is multiplied by 4 ☐ D. The shape becomes a different type of polygon
- ☐ B. The angles remain the same
- ☐ C. Each angle is divided by 4

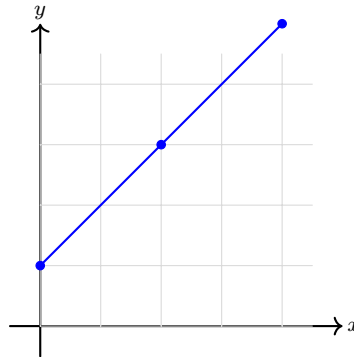


8)

A scatter plot shows a U-shaped curve: points start high, decrease to a low point in the middle, then increase again. Is this relationship linear or nonlinear? Explain.



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


☐ A. 2

☐ C. 1

☐ B. 3

☐ D. 4

Numbers

Rational
Irrational
 $\frac{1}{2}, 0.5$
 $\sqrt{2}, \pi$

10)

Which number should be placed in the Rational section?

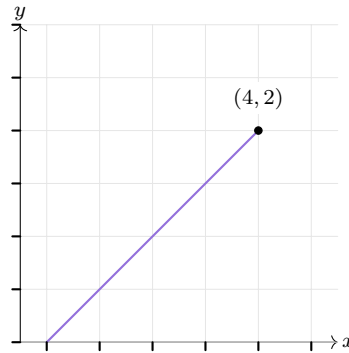
☐ A. $\sqrt{13}$
☐ C. $-\frac{9}{2}$
☐ B. $2 + \sqrt{5}$
☐ D. $\sqrt{\pi}$

11) Convert $0.\overline{135}$ to a fraction in simplest form.

☐ A. $\frac{1}{135}$
☐ C. $\frac{135}{999}$
☐ B. $\frac{135}{1000}$
☐ D. $\frac{134}{990} = \frac{67}{495}$


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1)

Using the linear model $y = 2.5x - 8$, find the predicted value of y when $x = 4$.

☐ A. 10☐ C. 4☐ B. 3☐ D. 2

- 2) A water tank is being drained at a constant rate. The relationship between time and remaining water is shown:

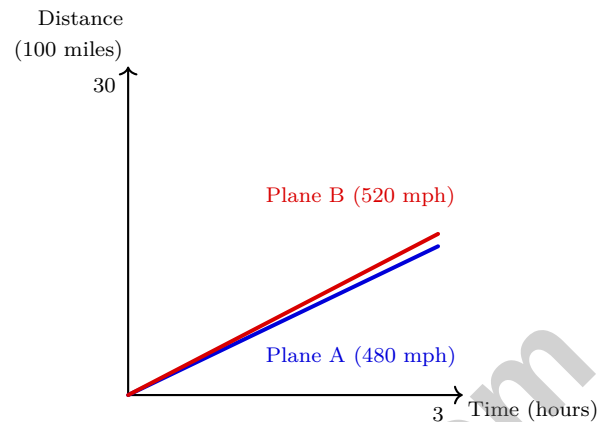
Time (min)	5	15	25
Water (gal)	60	40	20

What is the slope (rate of drainage)?

☐ A. -2 gallons per minute☐ C. -3 gallons per minute☐ B. 2 gallons per minute☐ D. 60 gallons per minute

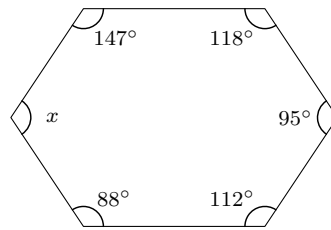
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- 3) Two planes depart from the same airport at the same time, flying in opposite directions. Plane A flies at 480 mph; Plane B flies at 520 mph. The graph shows their positions over time.



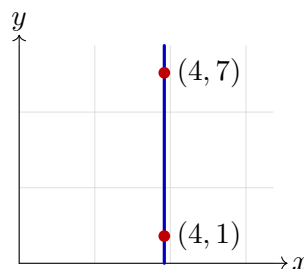
- After how many hours are the planes 3000 miles apart?
- ☐ A. 2.5 hours ☐ C. 3 hours
☐ B. 3.5 hours ☐ D. 4 hours
- 4) Which interpretation of MAD is correct?
- ☐ A. MAD tells you the largest value in the data ☐ C. MAD is always equal to the mean
☐ B. MAD measures the typical distance of data points from the mean ☐ D. MAD is usually negative
- 5) A restaurant offers 5 types of bread, 4 types of cheese, and 3 types of meat. How many different sandwich combinations are possible if you pick one of each?
- ☐ A. 12 ☐ C. 35
☐ B. 20 ☐ D. 60





1)

A hexagon has five interior angles: 88° , 112° , 95° , 118° , 147° . Find the sixth angle.

☐ A. 150° ☐ C. 170° ☐ B. 160° ☐ D. 180° 2) What are the two factors of the constant term -12 that will correctly factor $x^2 + x - 12$?☐ A. 3 and -4 ☐ C. 6 and -2 ☐ B. -3 and 4☐ D. 12 and -1 3) Distance traveled: Function $d_1(t) = 55t$ miles (constant speed). Function d_2 at hours $(0, 0)$, $(3, 180)$. After 6 hours, which distance greater?☐ A. d_1 ☐ C. Same distance☐ B. d_2 ☐ D. Cannot determine4) A graph shows a line with an undefined slope passing through $(4, 1)$ and $(4, 7)$. Which description fits?☐ A. The line is horizontal☐ C. The line has zero slope☐ B. The line is slanted at 45° ☐ D. The line is vertical

- 5) 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

- 6) If $f(x) = -3x + 10$, what is $f(2)$?

☐ A. 4 ☐ C. -6
☐ B. 16 ☐ D. 6

- 7) A function is increasing on the interval $[0, 3]$, then constant on $[3, 6]$, then decreasing on $[6, 9]$. On which interval does the maximum occur?

- 8) Parallel lines are cut by a transversal. If corresponding angles are $(5x - 10)^\circ$ and $(3x + 50)^\circ$, find x .

☐ A. 15 ☐ C. 25
☐ B. 20 ☐ D. 30

- 9) Which set of side lengths forms a right triangle?

☐ A. 7, 10, 12 ☐ C. 4, 5, 10
☐ B. 6, 8, 10 ☐ D. 1, 2, 4



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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.** (8.2.2.2) Using $y = mx + b$ where m is slope and b is y -intercept: $y = 4x + 6$.
- 2) **Choice D is correct.** (8.2.2.2) Slope = $\frac{20 - 40}{30 - 10} = \frac{-20}{20} = -1$ m/h. Using $(30, 20)$ with slope -1 : $0 = 20 - 1(t - 30)$, so $t = 50$.
- 3) **Choice C is correct.** (8.2.4.8) When traveling in opposite directions, their speeds add. Combined speed: $20 + 15 = 35$ mph. Distance: $d = rt$, so $105 = 35t$, giving $t = 3$ hours.
- 4) **Choice C is correct.** (8.2.2.2) If $f(2) = f(5)$, slope = $(f(5) - f(2))/(5 - 2) = 0/3 = 0$. Horizontal line.
- 5) **Choice B is correct.** (8.3.2.2) The sum of exterior angles of any convex polygon is always 360° , regardless of shape or number of sides.
- 6) **Choice B is correct.** (8.4.1.2) In $y = mx + b$, $b = 5$ is the y -intercept, representing the y -value when $x = 0$.
- 7) **Choice B is correct.** (8.3.2.3) Dilation preserves angles (and shape). Only lengths scale, not angle measures.
- 8) **The correct answer is nonlinear.** (8.4.1.1) Linear relationships form straight lines; nonlinear relationships form curves. A U-shape is a curve that changes direction, making it nonlinear.
- 9) **Choice B is correct.** (8.2.1.1) Locate $x = 2$ on the horizontal axis and read the corresponding y -coordinate from the graph: $y = 3$.
- 10) **Choice C is correct.** (8.1.1.1) Only $-\frac{9}{2}$ is rational (a fraction of two integers). The others are irrational: $\sqrt{13}$ is a non-perfect-square root, $2 + \sqrt{5}$ is a sum involving an irrational, and $\sqrt{\pi}$ is the root of an irrational.
- 11) **Choice D is correct.** (8.1.1.1) Let $x = 0.1\overline{35} = 0.13535\dots$. Then $10x = 1.3\overline{5}$ and $1000x = 135.\overline{35}$. Subtracting: $990x = 134$, so $x = \frac{134}{990} = \frac{67}{495}$.
- 12) **Choice D is correct.** (8.1.1.2) $4^2 = 16$ and $5^2 = 25$. Since 21 is between them and closer to the midpoint, $\sqrt{21} \approx 4.58 \approx 4.5$.
- 13) **Choice D is correct.** (8.1.1.2) Since $2.6^2 = 6.76 \approx 7$ and $2.65^2 \approx 7.02$, we estimate $\sqrt{7} \approx 2.65$.
- 14) **Choice C is correct.** (8.1.1.5) Divide: $\frac{8 \times 10^7}{2 \times 10^5} = \frac{8}{2} \times 10^{7-5} = 4 \times 10^2 = 400$.
- 15) **The correct answer is 5.** (8.3.1.2) Mean = 12.5. Deviations: $|5 - 12.5| = 7.5$, $|10 - 12.5| = 2.5$, $|15 - 12.5| = 2.5$, $|20 - 12.5| = 7.5$. Sum = 20. MAD = $20/4 = 5$.
- 16) **Choice B is correct.** (8.3.2.1) $SA = 2(\frac{3}{2} \times 1 + \frac{3}{2} \times \frac{1}{2} + 1 \times \frac{1}{2}) = 2(\frac{3}{2} + \frac{3}{4} + \frac{1}{2}) = 2(\frac{11}{4}) = \frac{11}{2}$ ft².
- 17) **The correct answer is $\frac{1}{4}$.** (8.3.1) There are 13 spades in a standard deck. $P(\text{spade}) = \frac{13}{52} = \frac{1}{4}$.
- 18) **The correct answer is B, C.** (8.2.2.1) $(x + 6)^2 = (x + 6)(x + 6) = x^2 + 12x + 36$. Choice B is the expanded form, and choice C is the factored form. Choice A ignores the middle term. Choice D has an error. Choice E is a different factorization that does not equal $(x + 6)^2$.
- 19) **The correct answer is 210.** (8.3.2.2) First digit: 7 choices. Second digit: 6 remaining. Third digit: 5 remaining. Total: $7 \times 6 \times 5 = 210$.
- 20) **Choice B is correct.** (8.3.2.2) Figure 2 is the mirror image of Figure 1 across the y -axis. Figure 3 is the mirror image of Figure 1 across the x -axis. The asymmetric triangle shape helps show the reflections clearly.
- 21) **Choice D is correct.** (8.2.4.2) Find common denominator (6): $\frac{3y}{6} + \frac{2y}{6} = 10 \Rightarrow \frac{5y}{6} = 10$. Multiply by 6: $5y = 60$. Divide by 5: $y = 12$.
- 22) **Choice A is correct.** (8.2.4.5) Add 3: $x > -4$. Open circle at -4 with right ray confirms this.
- 23) **Choice A is correct.** (8.3.1.2) The strict inequality $<$ uses a DASHED line. Since $y <$ the expression, shade BELOW.
- 24) **Choice B is correct.** (8.3.2.1) $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 27 = \frac{4}{3} \times 84.78 = 113.04$ in³.
- 25) **Choice C is correct.** (8.1.1.4) Savings account: $A = 1000(1 + 0.02 \times 4) = \$1,080$. Investment: $A = 1000(1 + 0.05 \times 4) = \$1,200$. Difference: $\$1,200 - \$1,080 = \$120$.
- 26) **Choice D is correct.** (8.1.1.4) Any nonzero number raised to the power 0 equals 1: $8^0 = 1$.
- 27) **Choice C is correct.** (8.2.4.9) $12 \times 12 \times 12 = 1728$, so $\sqrt[3]{1728} = 12$.
- 28) **Choice C is correct.** (8.1.1.5) 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.



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A Note for a Careful Thinker

Hi, Careful Thinker!

◇ This carefully paced book gave you four steady Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. This book gave you room to practice the kind of thinking eighth graders need: modeling linear relationships, solving systems, connecting algebra and geometry, and interpreting data. ◇

★ **Remember this:** The goal was never just to finish pages. The goal was to become the kind of student who knows how to begin, how to adjust, and how to check. ★

Your Careful-Thinking Toolkit

- **Read Twice:** First for the story, second for the math.
- **Label Values:** Give each number a job.
- **Check Signs:** Negatives and inequalities deserve attention.
- **Use Evidence:** Let the work prove the answer.

Grade 8 test-day tip: On test day, underline the question before solving. It keeps your answer aimed at the right target.

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

Jay Daie

Your Math Practice 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.