

10

Minnesota

MCA III

GRADE

8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

10

PRINTED
TESTS



2

ONLINE
TESTS



Build Confidence



Master Key Math Skills

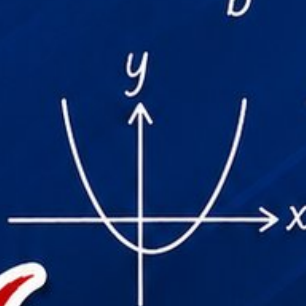
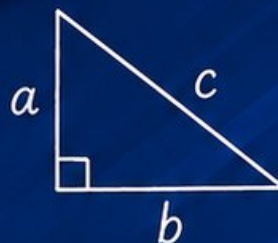


Answer Explanations for
Every Question



Test-Taking Strategies
That Work

$$y = mx + b$$



$$3x - 7 = 2(x + 5)$$
$$x = 17$$

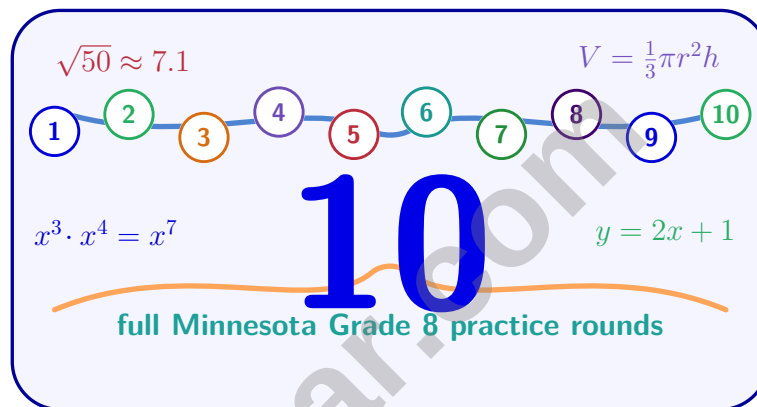


USE THESE TWO
**ADDITIONAL ONLINE
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER
THE PRINTED TESTS
IN THIS BOOK.

10 Minnesota MCA III Grade 8 Math Practice Tests

Minnesota Grade 8 MCA III Practice for steady practice through real numbers, proportional models, equations, geometry, data, and probability



Ten complete 40-question Grade 8 MCA III practice rounds with linear relationships, scientific notation, real numbers, equations, functions, 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!

Ten focused rounds for sharper Minnesota MCA III math thinking

This book gives you ten full Grade 8 MCA III math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

Grade 8 standards focus: This page supports **Congruent Figures** (8.3.2.2): Determine congruence using sequences of transformations. Another recurring target is **Counting Principle and Permutations** (8.3.2.2): Use the counting principle to determine the number of possible outcomes.

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 ten-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 a proportion, equation, diagram, number line, 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.

Grade 8 standards focus: Keep the routine connected to **Angles in Triangles and Parallel Lines** (8.3.2.2): Establish facts about angles in triangles and angles created by parallel lines cut by a transversal. The same routine helps with **Surface Area of Prisms, Cylinders, and Pyramids** (8.3.2.1): Understand and apply the relationships between the slopes of parallel lines and between the slopes of perpendicular lines. Dynamic graphing software may be used to examine these relationships.

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?

Ten Minnesota MCA III tests, 400 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading.
Tests 4–6	Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.
Tests 7–9	Data analysis, probability, mixed review, stamina, and choosing efficient strategies.
Test 10	A final Minnesota round to show growth across the whole book.
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.

Grade 8 standards focus: Use these habits while practicing **Volume of Cylinders, Cones, and Spheres** (8.3.2.1): Know the volume formulas for cylinders, cones, and spheres. You will also meet **Turning Repeating Decimals into Fractions** (8.1.1.1): Convert repeating decimals to rational number form.

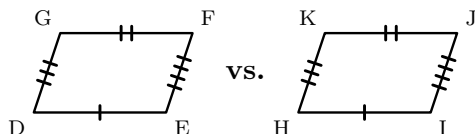


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& answers

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- 1) Quadrilateral DEFG is congruent to quadrilateral HIJK. A student wrote $DEFG \cong IJKH$. Which error did the student make?



- ☐ A. $DEFG \cong HIJK$ (correct order) ☐ C. $DEFG \cong KJHI$ (wrong order)
☐ B. $DEFG \cong IJKH$ (wrong vertex order) ☐ D. $DEFG \cong IHKJ$ (completely wrong order)
- 2) A cylindrical paint can has radius 2.5 feet and height 3 feet. The paint covers only the curved side (lateral surface), not the top or bottom. Which expression gives the area that needs paint?
- ☐ A. $2\pi(2.5)^2 + 2\pi(2.5)(3)$ ☐ C. $\pi(2.5)^2 + \pi(2.5)(3)$
☐ B. $2\pi(2.5)(3)$ ☐ D. $(2.5)(3)$
- 3) An online music streaming service charges per song. A listener downloads 8 songs for \$9.60. What is the cost per song?
- ☐ A. \$1.00 ☐ C. \$1.20
☐ B. \$1.10 ☐ D. \$1.30
- 4) The line $x + 2y = 8$ has slope:
- ☐ A. 1 ☐ C. $-\frac{1}{2}$
☐ B. -1 ☐ D. 2



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5) Solve by substitution: $\begin{cases} y = 3x \\ x + y = 12 \end{cases}$

☐ A. (2, 6)

☐ C. (4, 12)

☐ B. (6, 18)

☐ D. (3, 9)

- 6) A principal of \$3,000 is invested at 5% compound interest annually. What is the amount after 2 years (rounded to nearest cent)?

7) Solve: $2x - 6 \leq 10$

☐ A. $x \leq 8$

☐ C. $x \leq 2$

☐ B. $x \geq 8$

☐ D. $x \geq 2$

- 8) Which set of ordered pairs does NOT represent a function?

☐ A. $\{(0, 5), (1, 6), (2, 7), (3, 8)\}$

☐ C. $\{(1, 3), (2, 3), (3, 3), (4, 3)\}$

☐ B. $\{(1, 1), (2, 4), (3, 9), (4, 16)\}$

☐ D. $\{(2, 4), (2, 5), (3, 6), (4, 7)\}$

- 9) Which table represents a LINEAR function?

x	1	2	3	4
y	3	7	11	15

☐ A. Yes, the first differences are constant

☐ C. Yes, all y -values are positive

☐ D. No, the x -values increase

☐ B. No, the y -values are not all even



10) A line passes through $(2, 10)$ and has slope 3. What is the y -intercept?

☐ A. 3

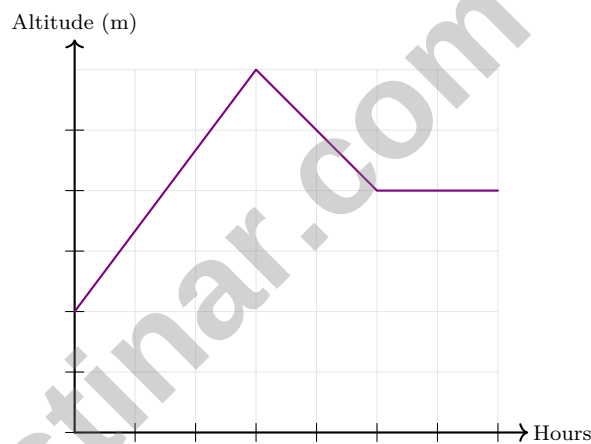
☐ C. 10

☐ B. 4

☐ D. 6

11) If $3^a \cdot 3^5 = 3^{12}$, what is the value of a ?

12)



A hiker's altitude over 7 hours: rises $[0, 3]$, descends $[3, 5]$, plateaus $[5, 7]$. What is the altitude at hour 5?

☐ A. 1 meter

☐ C. 4 meters

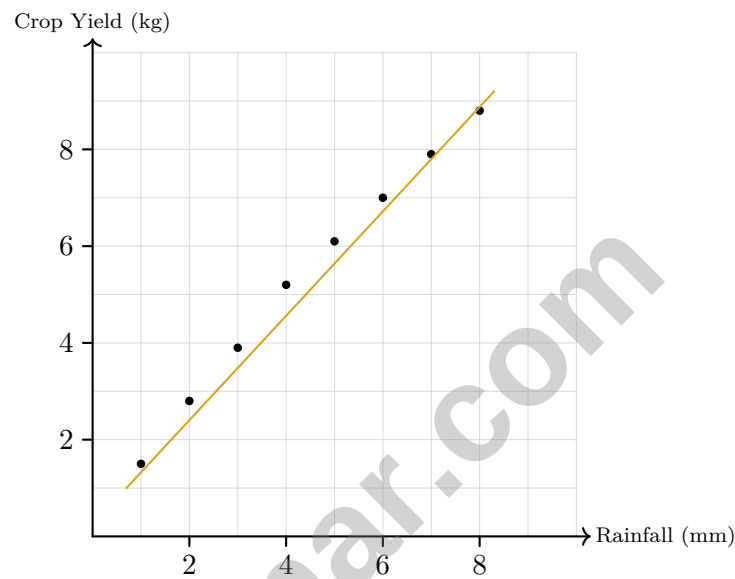
☐ B. 3 meters

☐ D. 5 meters



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- 1) A cylinder has volume 1570 cm^3 and diameter 20 cm. What is its height? (Use $\pi \approx 3.14$.)

☐ A. 2.5 cm☐ C. 5 cm☐ B. 10 cm☐ D. 15 cm

2)

In a study of rainfall and crop yield, the trend line shows a positive relationship. How much would yield increase for every 1 mm increase in rainfall?

☐ A. Between 1 and 2 kg☐ C. Between 2 and 3 kg☐ B. Less than 1 kg☐ D. More than 3 kg

- 3) Points $(-1, 5)$ and $(2, 14)$ lie on a line. Find the slope.



4) If $g(x) = x + 7$, what is $g(2)$?

☐ A. 5

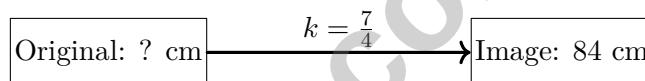
☐ C. 10

☐ B. 9

☐ D. 14

5) Function through $(1, 2)$ and $(4, 14)$. y -intercept?

6) A dilated figure has a perimeter of 84 cm. The scale factor used was $\frac{7}{4}$. What was the perimeter of the original figure?



7)

Decimal Types

Terminating	Repeating
0.5, 0.75	$0.\overline{12}$

Which decimal is rational?

☐ A. 0.123456... (non-repeating)

☐ C. 0.454545... (repeating)

☐ B. π

☐ D. e (Euler's number)



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1) Compare 3.2×10^5 and 5.1×10^4 . Which is larger?

- ☐ A. Cannot be determined ☐ C. They are equal
☐ B. 5.1×10^4 ☐ D. 3.2×10^5

2) Factor completely: $4x^2 + 16x + 16$.

- ☐ A. $4(x + 2)^2$ ☐ C. $(2x + 2)^2$
☐ B. $4(x^2 + 4x + 4)$ ☐ D. $4(x + 4)^2$

3) Comparison of graphs: Line A passes through origin with slope 2. Line B crosses y -axis at -3 with slope 1. At $x = 4$, which is higher?

- ☐ A. Line A ☐ C. Both equal
☐ B. Line B ☐ D. Cannot determine

4) A line passes through the points $(2, 5)$ and $(6, 13)$. What is the slope of the line?

- ☐ A. $\frac{1}{2}$ ☐ C. $\frac{3}{2}$
☐ B. 4 ☐ D. 2

5) A movie theater offers two pricing schemes: Scheme A costs \$8 per ticket, Scheme B costs \$60 upfront plus \$3 per ticket. For how many tickets is Scheme A cheaper?

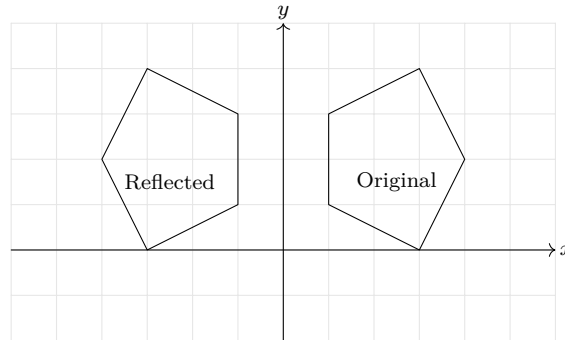
- ☐ A. Fewer than 12 tickets ☐ C. Fewer than 15 tickets
☐ B. Fewer than 10 tickets ☐ D. Fewer than 8 tickets

6) A furniture store's weekly profit is modeled by $P = 150w - 800$, where P is profit in dollars and w is number of items sold. What does the -800 represent?

- ☐ A. The profit per item sold ☐ C. The loss when $w = 0$
☐ B. The weekly operating costs ☐ D. The revenue generated



- 7) Pentagon PQRST is reflected across the y -axis to create pentagon P'Q'R'S'T'. Which of the following is true?



- ☐ A. The reflected pentagon is larger
- ☐ B. The perimeters are different
- ☐ C. The pentagons are congruent
- ☐ D. The angles are not equal
- 8) In $y = x^2 - 5$, what is the exponent on x ?



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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 B is correct.** (8.3.2.2) Corresponding vertices must be listed in order. From the diagram, $D \leftrightarrow H$, $E \leftrightarrow I$, $F \leftrightarrow J$, and $G \leftrightarrow K$, so the correct statement is $DEFG \cong HIJK$. The student's order $IJKH$ starts at the wrong corresponding vertex.
- 2) **Choice B is correct.** (8.3.2.1) Lateral (curved side) surface area $= 2\pi rh = 2\pi(2.5)(3)$. Options A includes the bases; C mixes formulas; D ignores π entirely.
- 3) **Choice C is correct.** (8.2.2.2) Unit price $k = \frac{9.60}{8} = 1.20$ dollars per song.
- 4) **Choice C is correct.** (8.2.2.2) Rewrite in slope-intercept form: $2y = -x + 8$, so $y = -\frac{1}{2}x + 4$. The slope is $-\frac{1}{2}$.
- 5) **Choice D is correct.** (8.2.4.7) Substitute $y = 3x$ into $x + y = 12$: $x + 3x = 12$, so $4x = 12$, giving $x = 3$. Then $y = 3(3) = 9$. Solution: (3, 9).
- 6) **The correct answer is \$3,307.50.** (8.1.1.4) $A = 3000(1.05)^2 = 3000 \times 1.1025 = \$3,307.50$.
- 7) **Choice A is correct.** (8.2.4.5) Add 6: $2x \leq 16$. Divide by 2: $x \leq 8$.
- 8) **Choice D is correct.** (8.2.1.1) Input 2 appears with outputs 4 and 5, which violates the function definition. Options A, B, and C are all functions.
- 9) **Choice A is correct.** (8.2.2.2) For a linear function, the differences between consecutive y -values are constant. Here: $7 - 3 = 4$, $11 - 7 = 4$, $15 - 11 = 4$. A constant first difference indicates linearity.
- 10) **Choice B is correct.** (8.2.4.3) Using $y = mx + b$: $10 = 3(2) + b \Rightarrow 10 = 6 + b \Rightarrow b = 4$.
- 11) **The correct answer is 7.** (8.1.1.4) Using the product rule, $a + 5 = 12$, so $a = 7$. Verification: $3^7 \cdot 3^5 = 3^{12}$.
- 12) **Choice B is correct.** (8.2.2.4) The graph reaches approximately 3m at hour 5 (the endpoint of the descending segment). This is where the plateau begins.
- 13) **Choice D is correct.** (8.3.2.2) The original triangle has base 2 (from (2, 0) to (4, 0)). The image has base 1. Scale factor: $\frac{1}{2}$.
- 14) **Choice A is correct.** (8.3.2.2) Angle 1 (63°) and angle 2 (95°) form a triangle with angle 3. The angle corresponding to angle 1 (by the parallel line property) is 63° . Then by triangle angle sum: angle 3 $= 180 - 63 - 95 = 22^\circ$.
- 15) **Choice B is correct.** (8.3.1.1) Using the Pythagorean Theorem: $11^2 + 60^2 = 121 + 3600 = 3721$, so $c = 61$ (the 11-60-61 triple).
- 16) **Choice A is correct.** (8.3.1.2) $d = \sqrt{(7-0)^2 + (24-0)^2} = \sqrt{49 + 576} = \sqrt{625} = 25$.
- 17) **Choice D is correct.** (8.3.2.1) Use $V = \frac{1}{3}\pi r^2 h$: $392.5 = \frac{1}{3} \times 3.14 \times r^2 \times 15$. Since $\frac{1}{3} \times 15 = 5$, $392.5 = 15.7r^2$, so $r^2 = 25$ and $r = 5$ cm.
- 18) **Choice B is correct.** (8.3.2.1) Corresponding angles are congruent when a transversal cuts parallel lines. So $v = 68^\circ$.
- 19) **The correct answer is B, E.** (8.3.1) There are 10 marbles total. B is true because $P(\text{blue}) = \frac{3}{10}$. E is true because $P(\text{red or blue}) = \frac{5+3}{10} = \frac{8}{10} = \frac{4}{5}$. A is false because $P(\text{red}) = \frac{1}{2}$. C is false because $P(\text{green}) = \frac{1}{5}$. D is false because $P(\text{yellow}) = 0$.
- 20) **Choice C is correct.** (8.3.2.1) Pyramid: $V_{py} = \frac{1}{3} \times 36 \times 6 = 72 \text{ cm}^3$. Cube: $V_c = 6^3 = 216 \text{ cm}^3$. Ratio: $\frac{72}{216} = 1 : 3$.
- 21) **Choice A is correct.** (8.3.1.1) Square area $= 12 \times 12 = 144 \text{ m}^2$. Triangle area $= \frac{1}{2} \times 4 \times 3 = 6 \text{ m}^2$. Remaining area $= 144 - 6 = 138 \text{ m}^2$. Option D traps those who skip subtraction; option C comes from minor arithmetic error.
- 22) **Choice B is correct.** (8.4.1.2) The data shown covers speeds 1–5 mph. Predicting at 60 mph is extreme extrapolation, where the linear model's assumptions break down.
- 23) **Choice C is correct.** (8.4.1.3) Joint relative frequency is the cell count divided by the grand total: $\frac{48}{360} = \frac{2}{15} \approx 0.133$.
- 24) **Choice A is correct.** (8.3.1.2) Smaller MAD (1.5) indicates more consistent performance near the mean. Player A's scores vary less, making him more predictably reliable.
- 25) **Choice A is correct.** (8.2.2.1) Find two numbers that multiply to -36 and add to 5: 9 and -4 . Verify: $9 \cdot (-4) = -36$ and $9 - 4 = 5$.
- 26) **Choice B is correct.** (8.2.2.2) P pace: 8 mph. Q pace: $(27 - 2)/3 = 25/3 \approx 8.33$ mph. Since $8.33 > 8$, Q is faster.



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Hi, Momentum Builder!

◇ Finishing a Grade 8 practice book is not a small thing. It means you practiced persistence, patience, and flexible problem solving. ◇

★ **Remember this:** Some questions were quick. Others probably made you stop and think. Both kinds helped you grow because practice turns effort into confidence. This version gave you 10 opportunities to rehearse test-day habits. ★

Momentum Habits

- **Start Clean:** Write down what the problem gives you.
- **Pick a Tool:** Use a table, model, equation, or graph.
- **Keep Moving:** Skip and return when needed.
- **Review Smart:** Study mistakes without judging yourself.

Grade 8 test-day tip: If a problem feels stuck, change tools. A graph, table, or sketch can make the same idea clearer.

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

Jay Daie

Your Math Momentum Partner

PRACTICE TODAY. SUCCEED TOMORROW!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



THIS BOOK INCLUDES:

10

Full-Length
Printed Tests

2

Online
Practice Tests



Detailed Answers
& Explanations



**MORE PRACTICE.
GREATER RESULTS.**

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

WHAT YOU'LL GAIN



**Build
Confidence**

Practice regularly to feel prepared and test-ready.



**Master
Key Skills**

Develop strong math skills and problem solving abilities.



**Improve
Understanding**

Learn with clear explanations and step-by-step solutions.



**Test
Strategies**

Learn proven strategies to approach every question with confidence.



**Boost
Performance**

Apply your knowledge and achieve your best score!

TOPICS COVERED

- | | |
|---------------------------|----------------------------|
| ✓ The Number System | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Data Analysis |
| ✓ Inequalities | ✓ Measurement |
| ✓ Functions | ✓ Pythagorean Theorem |
| ✓ Geometry | ✓ Surface Area & Volume |
| ✓ Ratios & Proportions | ✓ And More! |



2 ONLINE TESTS

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



2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE
REGULARLY



STAY
FOCUSED



SOLVE
CONFIDENTLY



SUCCEED
BRIGHTLY