

6 Minnesota MCA III

GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving For
Comprehensive Assessment Programs



6 PRINTED
TESTS



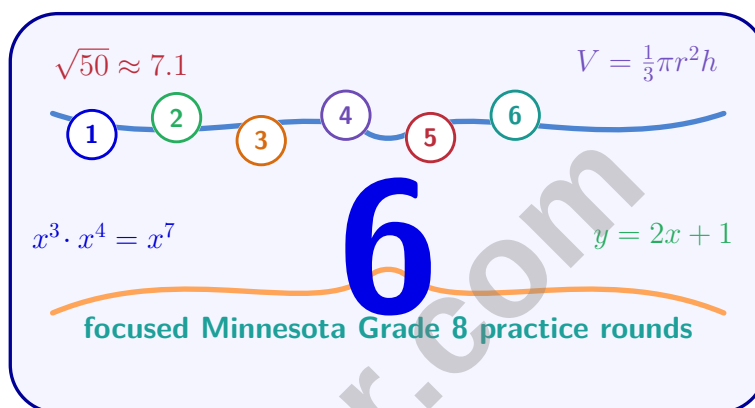
2 ONLINE
TESTS



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

6 Minnesota MCA III Grade 8 Math Practice Tests

Grade 8 Practice for Proportional Thinking, Functions, Geometry, and Data



Six 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!

Six focused rounds for sharper MCA III math thinking

This book gives you six 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 six-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?

Six MCA III tests, 240 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 4–6	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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& answers

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1) $\frac{5 \times 10^{-2}}{2.5 \times 10^{-5}} = ?$

☐ A. 0.2×10^3

☐ C. 2×10^3

☐ B. 2.5×10^{-7}

☐ D. 7.5×10^{-7}

2) Which of the following numbers is irrational?

☐ A. $\frac{3}{5}$

☐ C. $\sqrt{7}$

☐ B. $0.\overline{6}$

☐ D. $\sqrt{25}$

3) Between which two consecutive integers does $\sqrt[3]{100}$ lie?

☐ A. 2 and 3

☐ C. 3 and 4

☐ B. 5 and 6

☐ D. 4 and 5

4) Which order is correct from smallest to largest?

☐ A. $\sqrt{2}, \sqrt{5}, \sqrt{3}$

☐ C. $\sqrt{3}, \sqrt{2}, \sqrt{5}$

☐ B. $\sqrt{5}, \sqrt{3}, \sqrt{2}$

☐ D. $\sqrt{2}, \sqrt{3}, \sqrt{5}$

5) A credit card has a balance of \$800 with 18% APR. Which list correctly shows the interest charged each month (assuming no payments)?

☐ A. \$12, \$12, \$12, ...

☐ C. \$12, \$24, \$36, ...

☐ B. \$18, \$18, \$18, ...

☐ D. \$12, \$12.18, \$12.36, ...

6) Simplify $\frac{a^4b^3}{a^2b}$.

☐ A. a^2b^{-2}

☐ C. a^6b^4

☐ B. a^2b^3

☐ D. $\frac{a^2b^2}{1}$ or a^2b^2



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- 7) Two trend-line slopes are 1.2 and 1.1. What is their difference?

- 8) What is $\sqrt[3]{729}$?

☐ A. 8

☐ C. 10

☐ B. 11

☐ D. 9

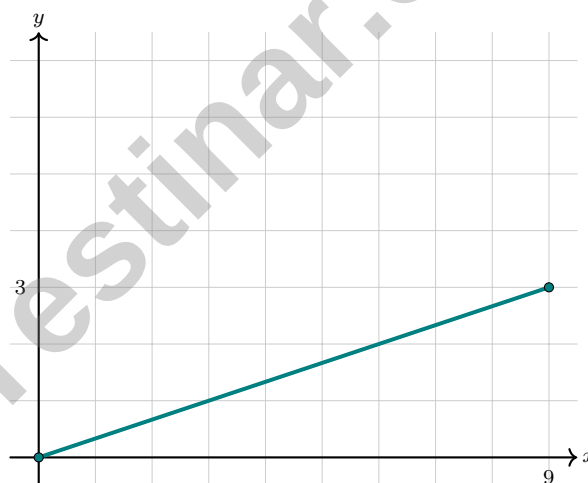
- 9) A grain of sand has mass 6.4×10^{-5} g. What is this in decimal form?

☐ A. 64,000 g

☐ C. 0.64 g

☐ B. 0.0064 g

☐ D. 0.000064 g



10)

The graph shows a proportional relationship. Find the equation.

☐ A. $y = 9x$

☐ C. $y = \frac{1}{3}x$

☐ B. $y = 3x$

☐ D. $y = x + 3$



11) Factor $x^2 - x - 20$.

☐ A. $(x - 5)(x + 4)$

☐ C. $(x - 10)(x + 2)$

☐ B. $(x + 5)(x - 4)$

☐ D. $(x - 20)(x + 1)$

12) Gym X: $\text{Cost}(m) = 30m$. Gym Y at month 1: \$50, month 3: \$115. Higher monthly fee?

☐ A. Gym X

☐ C. Both same.

☐ B. Gym Y

☐ D. Cannot be determined.

13) A line passes through the points $(1, 5)$ and $(4, 11)$. What is the slope of the line?

☐ A. 2

☐ C. $\frac{2}{3}$

☐ B. 3

☐ D. 6

14) A fitness trainer charges a client based on the number of sessions attended. The data table shows:

Sessions	2	5	8
Cost (\$)	60	150	240

What is the slope (cost per session)?

☐ A. \$30 per session

☐ C. \$20 per session

☐ B. \$60 per session

☐ D. \$150 per session

15) A concert venue sells adult tickets for \$15 and student tickets for \$8. If 120 total tickets were sold for \$1,520, how many student tickets were sold?

☐ A. 40

☐ C. 80

☐ B. 60

☐ D. 100



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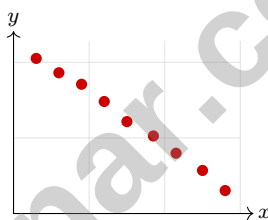
1) Which of the following is guaranteed to be a function?

- ☐ A. Any curve in the coordinate plane. ☐ C. Any set of points that passes the vertical line test.
☐ B. Any set of points that is symmetric about the y -axis. ☐ D. Any set of points with five or fewer ordered pairs.

2) A dilated figure has a side length of 12 cm and was created with a scale factor of 1.5 from the original. What was the original side length?

$$\underline{\quad ? \text{ cm} \quad} \xrightarrow{k = 1.5} \underline{\quad 12 \text{ cm} \quad}$$

- ☐ A. 8 cm ☐ C. 6 cm
☐ B. 18 cm ☐ D. 13.5 cm



3)

A scatter plot shows a clear downward trend from upper left to lower right. The points cluster tightly around the trend line. Which conclusion is correct?

- ☐ A. As one variable increases, the other tends to increase ☐ C. As one variable increases, the other tends to decrease
☐ B. This is a weak negative relationship ☐ D. The relationship is curved, not linear



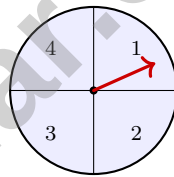
- 4) A retail store analyzes 500 transactions. 350 included a sale item and 150 did not. Of those with a sale item, 245 were from returning customers. What relative frequency (as a percent) of transactions with sale items are from returning customers?

☐ A. 49% ☐ C. 70%
☐ B. 56% ☐ D. 84%

- 5) A student incorrectly calculated the MAD and used the range instead. Data: $\{5, 8, 12, 15\}$, mean = 10. If the student found range = 10, what is the actual MAD?

☐ A. 2.5 ☐ C. 4
☐ B. 3.5 ☐ D. 5

- 6) A spinner has 4 equal sections. If it is spun three times, what is the probability of landing on section 1 all three times?



☐ A. $\frac{1}{16}$ ☐ C. $\frac{1}{64}$
☐ B. $\frac{1}{12}$ ☐ D. $\frac{3}{4}$

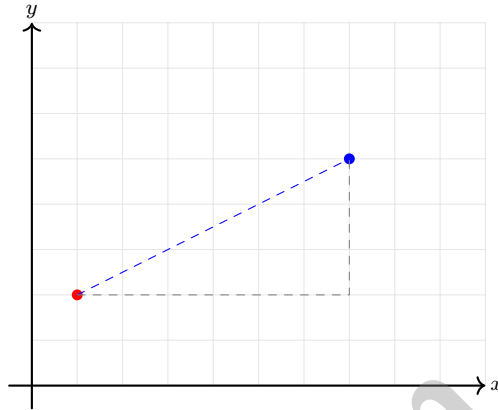
- 7) Which scenario requires permutation (order matters)?

☐ A. Selecting 2 students from a group of 10 to form a study pair. ☐ C. Picking 2 toppings from a pizza menu.
☐ B. Arranging 2 students from a group of 10 in a line (first and second position). ☐ D. Choosing 2 books to bring home from a library shelf.



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- 1) Two vertices of a rectangle are at $(1, 2)$ and $(7, 5)$. What is the length of the diagonal connecting these two vertices?



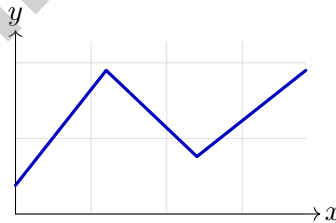
☐ A. $\sqrt{45}$

☐ C. 10

☐ B. 9

☐ D. 13

- 2) A function exhibits error: a student says “The graph increases at all points.” But the actual graph increases, then decreases, then increases again. Which statement correctly identifies the student’s error?



☐ A. The student only looked at one part of the graph

☐ C. The graph is decreasing everywhere

☐ B. The graph is increasing everywhere

☐ D. The graph is constant everywhere



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3) In a regular hexagon, each interior angle measures:

☐ A. 144°

☐ C. 90°

☐ B. 120°

☐ D. 108°

4) Triangle A has sides 5, 12, 13. Triangle B has sides 7.5, 18, 19.5. Triangle C has sides 10, 24, 26. Which triangles are similar to Triangle A ?

☐ A. Only Triangle B

☐ C. Both Triangle B and C

☐ B. Only Triangle C

☐ D. Neither Triangle B nor C

5) A right triangle has legs of $\sqrt{5}$ and $\sqrt{20}$. What is the hypotenuse?

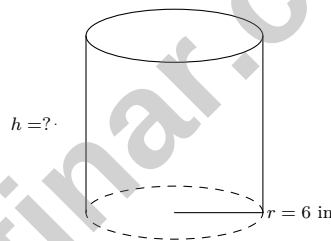
☐ A. 5

☐ C. $\sqrt{20}$

☐ B. $\sqrt{25}$

☐ D. $\sqrt{15}$

6)



A cylinder has radius 6 in and volume 1695.6 in^3 . What is its height? (Use $\pi \approx 3.14$.)

☐ A. 7.5 in

☐ C. 10 in

☐ B. 15 in

☐ D. 20 in



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 C is correct.** (8.1.1.5) Divide coefficients: $5 \div 2.5 = 2$. Subtract exponents: $10^{-2-(-5)} = 10^3$. Result: 2×10^3 .
- 2) **Choice C is correct.** (8.1.1.1) $\sqrt{7}$ is irrational because 7 is not a perfect square; its decimal expansion is non-terminating and non-repeating. $\frac{3}{5} = 0.6$ and $0.\overline{6} = \frac{2}{3}$ are rational. $\sqrt{25} = 5$ is rational.
- 3) **Choice D is correct.** (8.1.1.2) $4^3 = 64$ and $5^3 = 125$. Since $64 < 100 < 125$, we have $4 < \sqrt[3]{100} < 5$.
- 4) **Choice D is correct.** (8.1.1.2) $\sqrt{2} \approx 1.41$, $\sqrt{3} \approx 1.73$, $\sqrt{5} \approx 2.24$, so the order is increasing.
- 5) **Choice D is correct.** (8.1.1.4) Monthly rate: $18\%/12 = 1.5\%$. Month 1: $800 \times 0.015 = \$12$. Month 2: $812 \times 0.015 = \$12.18$. Month 3 uses the new balance, about \$824.18, so the interest is $824.18 \times 0.015 \approx \12.36 .
- 6) **Choice D is correct.** (8.1.1.4) Quotient rule for each variable: $\frac{a^4}{a^2} = a^2$ and $\frac{b^3}{b} = b^2$. Result: a^2b^2 .
- 7) **The correct answer is 0.1.** (8.4.1.2) Compute $1.2 - 1.1 = 0.1$.
- 8) **Choice D is correct.** (8.2.4.9) $9 \times 9 \times 9 = 729$, so $\sqrt[3]{729} = 9$.
- 9) **Choice D is correct.** (8.1.1.5) Move the decimal 5 places left: $6.4 \times 10^{-5} = 0.000064$ g.
- 10) **Choice C is correct.** (8.2.2.2) Slope $k = \frac{3}{9} = \frac{1}{3}$. Equation: $y = \frac{1}{3}x$.
- 11) **Choice A is correct.** (8.2.2.1) Find two numbers that multiply to -20 and add to -1 : -5 and 4 . Check: $-5 \cdot 4 = -20$ and $-5 + 4 = -1$.
- 12) **Choice B is correct.** (8.2.2.2) X fee: \$30/mo. Y fee: $(115 - 50)/(3 - 1) = 65/2 = 32.5/\text{mo}$. Since $32.5 > 30$, Y is higher.
- 13) **Choice A is correct.** (8.2.4.3) Slope is $m = \frac{11-5}{4-1} = \frac{6}{3} = 2$.
- 14) **Choice A is correct.** (8.2.2.2) Using $(2, 60)$ and $(5, 150)$: slope $= \frac{150 - 60}{5 - 2} = \frac{90}{3} = \30 per session.
- 15) **Choice A is correct.** (8.2.4.8) Let a = adult tickets and s = student tickets. Then $a + s = 120$ and $15a + 8s = 1520$. Substitute $a = 120 - s$: $15(120 - s) + 8s = 1520$, so $1800 - 7s = 1520$. Then $7s = 280$, so $s = 40$.
- 16) **The correct answer is $\frac{1}{2}$.** (8.3.1) Sample space: HH, HT, TH, TT. Exactly one heads: HT, TH. That's 2 of 4. $P = \frac{1}{2}$.
- 17) **Choice D is correct.** (8.2.1.1) Substitute $x = 4$: $f(4) = \frac{2(4)+5}{3} = \frac{8+5}{3} = \frac{13}{3}$.
- 18) **Choice B is correct.** (8.3.2.1) $SA = 2\pi r^2 + 2\pi rh = 2\pi(2)^2 + 2\pi(2)(6) = 8\pi + 24\pi \text{ in}^2$.
- 19) **The correct answer is A,C.** (8.3.2.3) Correct: (A) All linear measurements (sides, perimeter) are multiplied by 2.5. (C) Area is multiplied by $(2.5)^2 = 6.25$. Incorrect: (B) Angles are congruent in dilation, not scaled. (D) Perimeter is multiplied, not divided, by 2.5. (E) Dilation preserves shape; polygon type does not change.
- 20) **Choice C is correct.** (8.3.2.2) Reflection across $y = -x$ maps $(x, y) \rightarrow (-y, -x)$. The point $(1, 2)$ maps to $(-2, -1)$ in the image.
- 21) **Choice D is correct.** (8.2.2.2) The y -intercept is the constant term b in $y = mx + b$, which is 4.
- 22) **Choice A is correct.** (8.2.4.2) Expand: $5x - 10 = 3x + 6$. Subtract $3x$ and add 10: $2x = 16$, so $x = 8$.
- 23) **Choice D is correct.** (8.2.4.5) Subtract 3: $-2x > -8$. Divide by -2 (FLIP): $x < 4$. Open circle and left ray.
- 24) **Choice A is correct.** (8.3.1.2) Test $(0, 0)$: $3(0) + 2(0) = 0 \leq 12$ TRUE. The boundary is included, so use $\leq$.
- 25) **Choice C is correct.** (8.3.1.1) Check C: $7^2 + 9^2 = 49 + 81 = 130 \neq 121 = 11^2$. All others satisfy the Pythagorean Theorem (A: 9-12-15 is 3-4-5 scaled by 3; B: 6-8-10 is 3-4-5 scaled by 2; D: 20-21-29 is a Pythagorean triple).
- 26) **Choice A is correct.** (8.3.2.1) Volume of a cone: $V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 3.14 \times 5^2 \times 12 = \frac{1}{3} \times 942 = 314 \text{ m}^3$.
- 27) **Choice D is correct.** (8.4.1.2) From 10°C to 15°C (an increase of 5°), chirps go from about 8 to 11 hundreds, an increase of about 3 hundreds.
- 28) **Choice A is correct.** (8.2.4.7) The two lines intersect at the point marked on the graph. At this point, both $x = 1$ and $y = 2$. Verify: $y = 1 + 1 = 2$ ✓ and $1 + 2 = 3$ ✓.
- 29) **Choice B is correct.** (8.2.1.1) A function requires each input to have exactly one output. For $y = \sqrt{x}$, each non-negative input x has exactly one non-negative square root.



Hi, Strategy Solver!

◇ Grade 8 math rewards students who think before they calculate. You practiced choosing strategies, not just hunting for answers. This deep and steady book gave you six full Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** That matters because stronger math students do not use one method for every question. They notice the structure and choose the tool that fits. ★

Strategy Moves

- **Estimate:** Know the neighborhood of the answer.
- **Simplify:** Rewrite numbers in friendlier forms.
- **Model:** Draw what the words describe.
- **Verify:** Put the answer back into the problem.

Grade 8 test-day tip: Pause for ten seconds before hard questions. A short plan can save several minutes.

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

Jay Daie

Your Strategy Guide

PRACTICE TODAY. ACHIEVE TOMORROW.

6

Give your child the confidence and skills they need with **6 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!

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 | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Pythagorean Theorem |
| ✓ Ratios & Proportional Relationships | ✓ Volume & Surface Area |
| ✓ Linear Equations | ✓ Transformations |
| ✓ Functions | ✓ Inequalities |
| ✓ Geometry | ✓ Data Analysis & Graphing |
| | ✓ And More! |



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2 ONLINE TESTS



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