

3

Minnesota

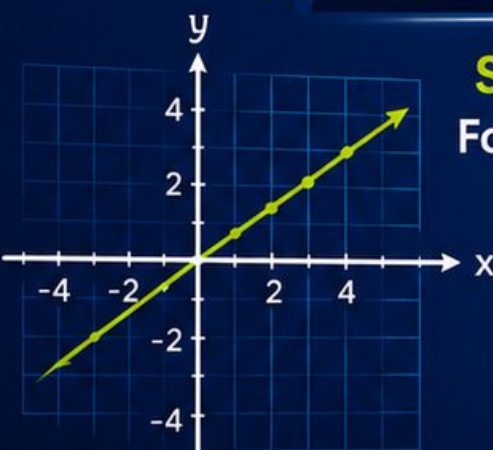
MCA III

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$V = s^3$$



$$y = mx + b$$
$$2x + 5 = 13$$
$$x = 4$$



3

PRINTED TESTS



2

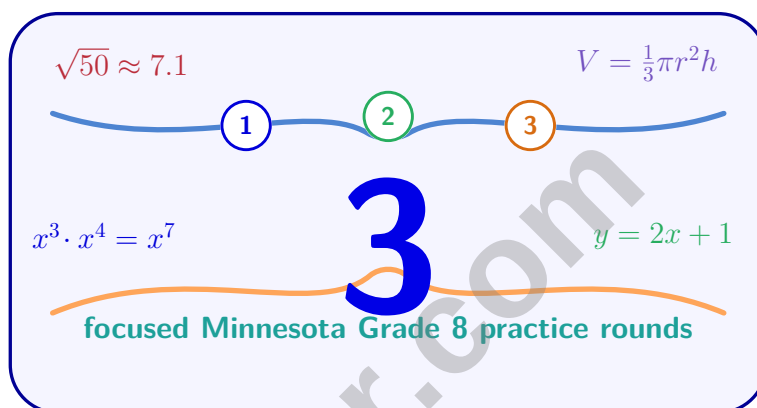
ONLINE TESTS



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

3 Minnesota MCA III Grade 8 Math Practice Tests

Grade 8 Minnesota Math Review for Skills, Stamina, and Strategy



Three 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!

Three focused rounds for sharper MCA III math thinking

This book gives you three 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 three-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?

Three MCA III tests, 120 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Test 3	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



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- 1) Triangle with vertices at $(1, 0)$, $(3, 0)$, and $(2, 2)$ is dilated by a scale factor of 0.5 from the origin. What is the area ratio of the new triangle to the original?

☐ A. 0.5☐ C. 2☐ B. 0.25☐ D. 4

- 2) A rectangular pyramid (not square) has a rectangular base with dimensions $5 \text{ m} \times 3 \text{ m}$. The slant heights are 8 m (for the pair of triangular faces on the longer base edges) and 7 m (for the pair on the shorter edges). What is the lateral surface area?

☐ A. $40 + 30 = 70 \text{ m}^2$ ☐ C. 100 m^2 ☐ B. $2 \times \frac{1}{2}(5)(8) + 2 \times \frac{1}{2}(3)(7) = 61 \text{ m}^2$ ☐ D. 120 m^2

- 3) Solve for y : $\frac{y-3}{2} = 5$

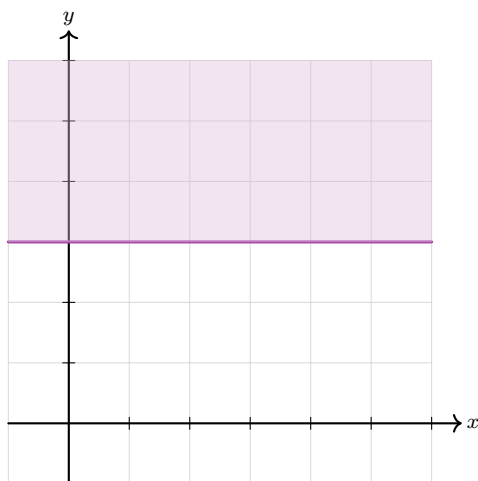
☐ A. $y = 13$ ☐ C. $y = 4$ ☐ B. $y = 7$ ☐ D. $y = 10$

- 4) Solve: $-\frac{1}{2}x + 3 \geq 5$

☐ A. $x \geq -4$ ☐ C. $x \geq 4$ ☐ B. $x \leq 4$ ☐ D. $x \leq -4$ 

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5)

Which inequality is represented?

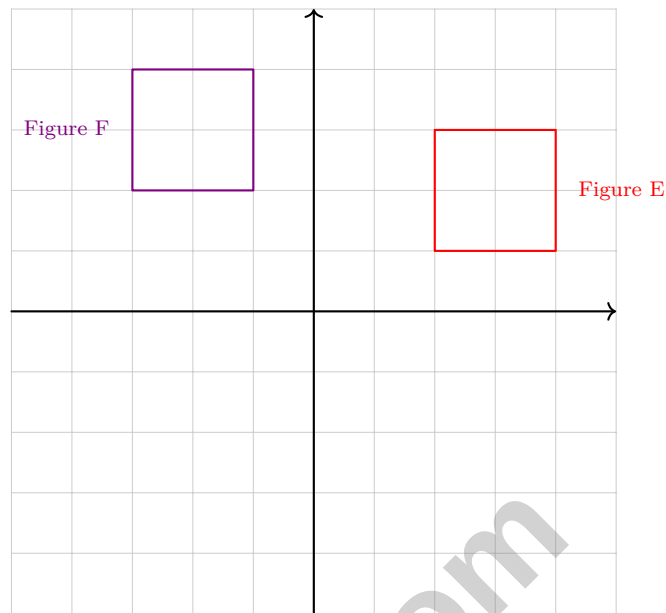
☐ A. $y \geq 3$

☐ B. $y \leq 3$

☐ C. $y > 3$

☐ D. $y < 3$





6)

Figures E and F are congruent. If Figure E was transformed to Figure F, which transformation(s) could have been applied?

- ☐ A. Only a translation
 ☐ C. A reflection and a translation
- ☐ B. Only a reflection
 ☐ D. A rotation and a dilation
- 7) A student calculates that a \$400 purchase at 12% APR for 1 month costs \$48 in interest. What is the error in her reasoning?
- ☐ A. She divided the annual rate by 12 instead of using it directly
 ☐ C. She calculated 12% of 12% instead of 12% of the principal
- ☐ B. She forgot that APR stands for Annual Percentage Rate
 ☐ D. She treated the annual rate as if it applies to one month



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1) When point (a, b) is rotated 180° about the origin, it maps to:

☐ A. (a, b)

☐ C. (b, a)

☐ B. $(-a, -b)$

☐ D. $(-b, -a)$

2) Convert $0.9\overline{3}$ to a fraction in simplest form.

☐ A. $\frac{93}{100}$

☐ C. $\frac{93}{99}$

☐ B. $\frac{9}{30}$

☐ D. $\frac{84}{90} = \frac{14}{15}$

3) A student claims $\sqrt{50}$ is between 5 and 6 because 50 is between 5 and 6. What is the student's error?

☐ A. Correct reasoning

☐ D. Should compare 50 to perfect squares, not integers

☐ B. Should use 7 and 8 instead

☐ C. $\sqrt{50}$ is actually an integer

4) Between which two consecutive integers does $\sqrt{24}$ fall?

n	n^2	Compare to 24
3	9	Too small
4	16	Too small
5	25	Too large

☐ A. Between 3 and 4

☐ C. Between 5 and 6

☐ B. Between 6 and 7

☐ D. Between 4 and 5

5) A chemist combines a 25% salt solution with an 80% salt solution to make 100 mL of a 50% solution. How many mL of the 25% solution are used?

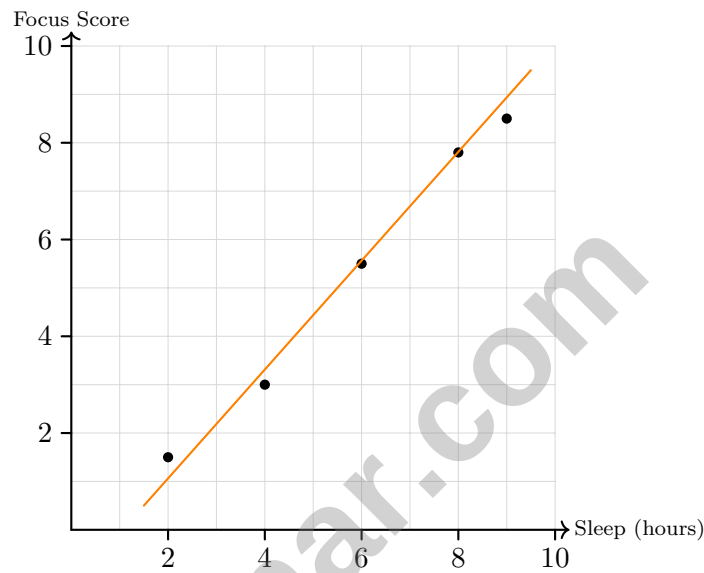


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- 6) How many times smaller is 1.5×10^{-6} than 1.5×10^{-3} ?
- ☐ A. 3 times ☐ C. 300 times
☐ B. 30 times ☐ D. 1,000 times
- 7) A square pyramid has a base with side length 8 cm and height 3 cm. Approximate the slant height and then calculate the surface area. (Use $\sqrt{25} = 5$.)
- ☐ A. Slant height ≈ 5 cm, SA ≈ 129 cm² ☐ C. Slant height ≈ 4 cm, SA ≈ 113 cm²
☐ B. Slant height ≈ 5 cm, SA ≈ 144 cm² ☐ D. Slant height ≈ 6 cm, SA ≈ 161 cm²
- 8) Solve for x : $6x + 2 = 5x + 9$
- ☐ A. $x = 7$ ☐ C. $x = 11$
☐ B. $x = -7$ ☐ D. $x = 2$
- 9) What is the solution to $-2(x + 3) > 8$?
- ☐ A. $x > -7$ ☐ C. $x < -7$
☐ B. $x > 7$ ☐ D. $x < 7$
- 10) Is the point $(0, 0)$ on the boundary line of $2x + 3y = 0$?
- ☐ A. Yes ☐ C. Only if $x = 0$
☐ B. No ☐ D. Only if $y = 0$
- 11) A college savings plan earns 7% compound interest annually. If \$5,000 is invested for 10 years, approximately how much will be accumulated?
- ☐ A. \$8,500 ☐ C. \$11,500
☐ B. \$13,800 ☐ D. \$9,835



- 1) A cylinder with radius 8 m and height 6 m has a cone inscribed with the same base and height. What is the difference in their volumes? (Use $\pi \approx 3.14$.)

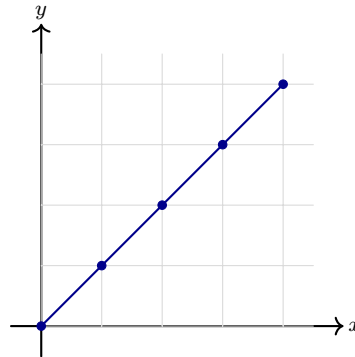
☐ A. 201.6 m³☐ C. 604.8 m³☐ B. 403.2 m³☐ D. 803.84 m³

2)

Based on the trend line, if a student sleeps 7 hours, what is the predicted focus score?

☐ A. Approximately 5☐ C. Approximately 7☐ B. Approximately 6☐ D. Approximately 8

3) From the graph of $h(x)$, find the value of x where $h(x) = 2$.



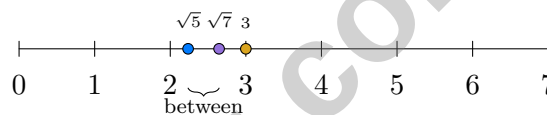
☐ A. $x = 1$

☐ C. $x = 3$

☐ B. $x = 2$

☐ D. $x = 4$

4)



Based on the number line, which statement is correct?

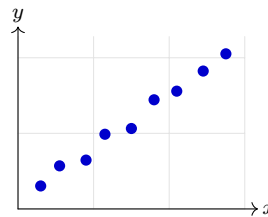
☐ A. $\sqrt{5}$ and $\sqrt{7}$ are both less than 1

☐ C. 3 is irrational

☐ B. $\sqrt{7} > 3$

☐ D. $2 < \sqrt{5} < \sqrt{7} < 3$

5)



A scatter plot displays the relationship between temperature (in degrees Celsius) and ice cream sales (in dollars) for 12 weeks. The points show a clear upward trend from left to right. Which statement correctly describes the correlation?

☐ A. Negative correlation

☐ C. No correlation

☐ B. Positive correlation

☐ D. Random scatter with no pattern



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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.** (8.3.2.3) Area scales by the square of the linear scale factor: $(0.5)^2 = 0.25$.
- 2) **Choice B is correct.** (8.3.2.1) Two triangular faces on the 5 m edges have total area $2 \times \frac{1}{2}(5)(8) = 40 \text{ m}^2$. Two triangular faces on the 3 m edges have total area $2 \times \frac{1}{2}(3)(7) = 21 \text{ m}^2$. Total lateral area is $40 + 21 = 61 \text{ m}^2$.
- 3) **Choice A is correct.** (8.2.4.2) Multiply by 2: $y - 3 = 10$. Add 3: $y = 13$.
- 4) **Choice D is correct.** (8.2.4.5) Subtract 3: $-\frac{1}{2}x \geq 2$. Multiply by -2 (FLIP): $x \leq -4$.
- 5) **Choice A is correct.** (8.3.1.2) Solid horizontal line at $y = 3$ with shading ABOVE means $y \geq 3$.
- 6) **Choice A is correct.** (8.3.2.2) Figure E and Figure F have the same size and orientation. Each point moves 5 units left and 1 unit up (translation), not a rotation which would change orientation.
- 7) **Choice D is correct.** (8.1.1.4) Correct: $I = 400 \times (0.12/12) \times 1 = \4 . She incorrectly applied 12% for 1 month (should use the monthly rate of 1%), mistaking APR as a monthly rate.
- 8) **The correct answer is 3.33×10^5 .** (8.1.1.5) Divide: $\frac{2 \times 10^{30}}{6 \times 10^{24}} = \frac{2}{6} \times 10^6 = \frac{1}{3} \times 10^6 \approx 3.33 \times 10^5$.
- 9) **Choice C is correct.** (8.1.1.4) When multiplying powers with the same base, add exponents: $3^2 \cdot 3^5 = 3^{2+5} = 3^7$.
- 10) **Choice C is correct.** (8.2.4.9) Area = 361, so $s = \sqrt{361} = 19 \text{ cm}$. Perimeter = $4s = 4 \times 19 = 76 \text{ cm}$.
- 11) **Choice C is correct.** (8.1.1.5) $1.5 \times 10^4 \times 10 = 1.5 \times 10^{4+1} = 1.5 \times 10^5 = 150,000$.
- 12) **The correct answer is $\frac{53}{90}$.** (8.1.1.1) Set $x = 0.5\bar{8} = 0.5888\dots$. Then $10x = 5.\bar{8}$ and $100x = 58.\bar{8}$. Subtracting: $90x = 53$, so $x = \frac{53}{90}$.
- 13) **Choice C is correct.** (8.2.2.2) Substitute $t = 3.5$: $d = 12(3.5) = 42 \text{ miles}$. The proportional relationship scales with time.
- 14) **Choice D is correct.** (8.2.2.2) Slope = $\frac{9-1}{2-(-2)} = \frac{8}{4} = 2$.
- 15) **Choice C is correct.** (8.2.4.7) The graph shows only one line drawn (or the same line twice). When both equations represent the same line, every point on the line is a solution, giving infinitely many solutions.
- 16) **Choice A is correct.** (8.2.1.1) Option A fails the function test: input 3 maps to both 1 and 2. The other options each have unique input-output pairs.
- 17) **Choice B is correct.** (8.2.2.2) $y = 3x - \frac{1}{5}$ is in the form $y = mx + b$ with $m = 3$ and $b = -\frac{1}{5}$, so it is linear.
- 18) **The correct answer is $(6, 7)$.** (8.1.1.2) $6^2 = 36$ and $7^2 = 49$. Since $36 < 45 < 49$, we have $6 < \sqrt{45} < 7$.
- 19) **The correct answer is A,C.** (8.1.1.1) Statement A is true because rational numbers are closed under addition. Statement C is true because any terminating decimal, such as $0.75 = \frac{3}{4}$, is rational. Statement B is false because two irrational numbers can multiply to a rational number, for example $\sqrt{2} \times \sqrt{8} = 4$. Statement D is false because integers are rational. Statement E is false because perfect squares have rational square roots, not irrational ones.
- 20) **Choice C is correct.** (8.2.4.3) With a flat monthly fee and no variable costs, the total cost is always \$50 regardless of which month. Equation: $C = 50$ (a constant function).
- 21) **Choice B is correct.** (8.2.2.4) A zero of f is a value of x where $f(x) = 0$. This is exactly where the graph crosses the x -axis (x -intercept). Same point, same concept, two names.
- 22) **Choice C is correct.** (8.3.2.2) Perimeter of PQRS = $10 + 14 + 5 + 7 = 36 \text{ cm}$. Since TUVW is congruent to PQRS, its perimeter is also 36 cm.
- 23) **Choice A is correct.** (8.3.2.2) Reflecting across the x -axis maps $(0, 1) \rightarrow (0, -1)$ and $(2, 2) \rightarrow (2, -2)$. Translating left 4 gives $(-4, -1)$ and $(-2, -2)$, matching the image rectangle.
- 24) **Choice B is correct.** (8.3.2.2) Triangle angle sum: $180 - 35 - 62 = 83^\circ$.
- 25) **Choice A is correct.** (8.3.1.1) From $15^2 + 20^2 = 225 + 400 = 625$, we get $c = 25$. The difference is $25 - 15 = 10$ (scaled 3-4-5 triple).
- 26) **The correct answer is 5.7.** (8.1.1.2) $\sqrt{32} = 4\sqrt{2} \approx 4 \times 1.41 = 5.66 \approx 5.7 \text{ meters}$.
- 27) **Choice D is correct.** (8.3.1.2) $c^2 = 5^2 + 12^2 = 25 + 144 = 169$, so $c = \sqrt{169} = 13$.



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Hi, Grade 8 Math Star!

◇ You finished this practice set with real effort. Grade 8 math asks you to connect ideas, explain your thinking, and stay steady through multi-step problems. ◇

★ **Remember this:** Every page you completed helped build stronger habits: reading carefully, choosing a method, showing work, and checking whether the answer makes sense. You practiced across 3 full Grade 8 practice tests, and that repeated effort matters. ★

What You Built

- **Focus:** You stayed with challenging questions.
- **Accuracy:** You learned to slow down when details matter.
- **Reasoning:** You practiced explaining why a method works.
- **Readiness:** You are more prepared than when you started.

Grade 8 test-day tip: Before test day, review the questions that made you pause. Those are the best teachers.

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!

GRADE
8

Give your child the edge they need with **3 full-length** Grade 8 Math practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, boosting confidence, and preparing for 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.



Build Skills & Boost Confidence

Strengthen understanding and feel prepared for test day.

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!



2 Extra Online Practice Tests Included!

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

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PRACTICE. PREPARE. SUCCEED.



Testinar

More Practice. More Confidence.
Better Results.