

# MINNESOTA MCA III

## GRADE 8 MATH

## PRACTICE TESTS

# 5

PRINTED  
TESTS



# 2

 ONLINE  
TESTS

**Standards Aligned  
Problem Solving For  
Comprehensive Assessment Programs**



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



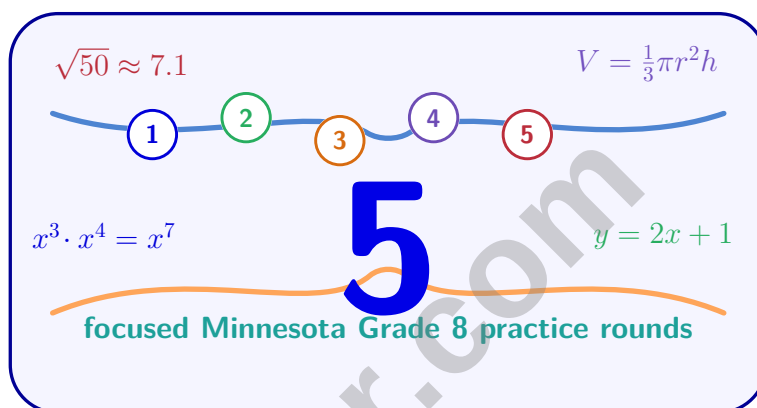
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

# 5 Minnesota MCA III Grade 8 Math Practice Tests

*Focused MCA III Prep for Geometry, Functions, and Data*



Five 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**



# Copyright ©

## Testinar Inc



Published by Testinar Inc

[Testinar.com](http://Testinar.com)

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law, including Section 107 or 108 of the 1976 United States Copyright Act.

This publication is independently produced and has no official connection to any state, district, or national testing program.

Test names and organizational names used herein are the property of their respective trademark holders.



*Copyright ©*

# Welcome, Minnesota Grade 8 Problem Solver!

Five focused rounds for sharper MCA III math thinking

This book gives you five 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 five-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?

Five MCA III tests, 200 questions, and a focused review path

| Part         | What You Will Practice                                                                        |
|--------------|-----------------------------------------------------------------------------------------------|
| Tests 1–2    | Real numbers, exponents, scientific notation, equations, and careful reading.                 |
| Tests 3–5    | 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.



Scan me!  
For more practice  
& answers

# Table of Contents

|                                        |       |     |
|----------------------------------------|-------|-----|
| ★ Practice Test 1                      | _____ | 15  |
| ★ Practice Test 2                      | _____ | 31  |
| ★ Practice Test 3                      | _____ | 47  |
| ★ Practice Test 4                      | _____ | 64  |
| ★ Practice Test 5                      | _____ | 80  |
| Practice Test Answer Keys              | _____ | 96  |
| Practice Test Answers and Explanations | _____ | 100 |

1) If  $5.7 \times 10^7 = 57,000$ , what is the exponent?

☐ A. 3

☐ C. 5

☐ B. 2

☐ D. 4

2) If a square has side length  $(x + 3)$ , and a smaller square inside has side length  $(x - 3)$ , what is the difference in their areas?

☐ A. 6

☐ C.  $12x$

☐ B. 9

☐ D.  $x^2$

3)  $S(m) = 500 + 25m$  and table  $(0, \$600)$ ,  $(3, \$675)$ ,  $(6, \$750)$ . Which starts with more money?

| $m$            | 0     | 3     | 6     |
|----------------|-------|-------|-------|
| Table function | \$600 | \$675 | \$750 |

☐ A.  $S$

☐ C. Both same.

☐ B. Table function

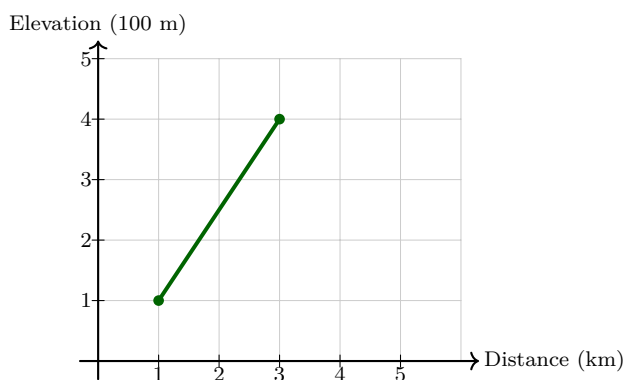
☐ D. Cannot be determined.

4) Solve the system  $\begin{cases} x + y = 8 \\ x - y = 2 \end{cases}$  by elimination.



Scan me!  
For more practice  
& answers

- 5) The graph shows elevation change during a hike.



What is the slope of the line?

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

- ☐ C.  $\frac{3}{2}$   
☐ D. 2

- 6) A triangle has sides such that one side is 2 cm longer than the shortest side, and the longest side is 4 cm longer than the shortest. If the perimeter is 18 cm, what is the shortest side?

- ☐ A. 4 cm  
☐ B. 5 cm

- ☐ C. 6 cm  
☐ D. 7 cm

- 7) The table shows values of  $f(x) = 3x - 2$ . What is  $f(5)$ ?

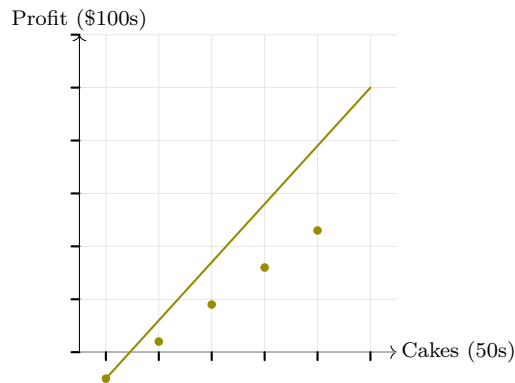
|        |   |   |   |   |
|--------|---|---|---|---|
| $x$    | 1 | 2 | 3 | 5 |
| $f(x)$ | 1 | 4 | 7 | ? |

- ☐ A. 13  
☐ B. 15

- ☐ C. 12  
☐ D. 17



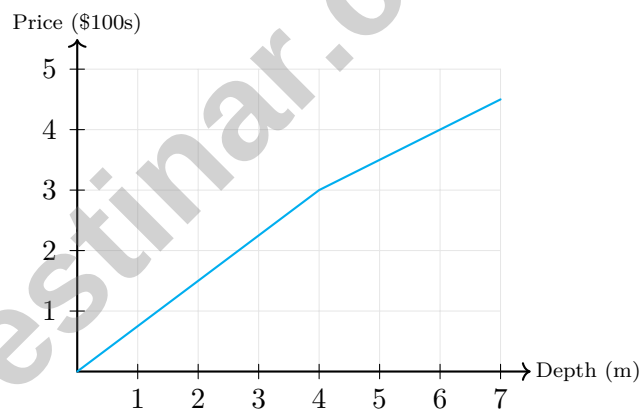
8)



A bakery's profit model is  $P = 3.2c - 250$ , where  $P$  is profit and  $c$  is the number of cakes sold. How many whole cakes must be sold to achieve at least a \$500 profit?

- ☐ A. 156 cakes                      ☐ C. 235 cakes  
☐ B. 172 cakes                      ☐ D. 281 cakes

9)



The graph shows well-drilling cost vs. depth. Why does the slope change at 4 meters depth?

- ☐ A. The drilling cost stays the same at all depths                      ☐ C. The drilling stops at 4 meters  
☐ B. Different rock layers require different rates                      ☐ D. Cost actually decreases, shown by a negative slope



Scan me!  
For more practice  
& answers

1) Plant  $X$ :  $H(d) = 2d + 10$  cm. Plant  $Y$  at days 0, 5, 10 has heights 15, 20, 25 cm. Which started taller?

☐ A. Plant  $X$

☐ B. Plant  $Y$

☐ C. Both same.

☐ D. Cannot be determined.

2) A student claims that  $10x + 25$  factors as  $5(2x + 5)$ . Is this completely factored?

☐ A. Yes, this is the complete factorization.

☐ B. No; the GCF should be 10.

☐ C. No;  $2x + 5$  can be factored further.

☐ D. No; a factor of 5 can still be removed.

3) A taxi charges \$3 to get in the car plus \$0.50 per mile driven. If  $d$  represents the distance in miles and  $C$  represents the cost in dollars, which equation models this situation?

☐ A.  $C = 0.50d + 3$

☐ B.  $C = 3d + 0.50$

☐ C.  $C = 3.50d$

☐ D.  $C = 0.50d - 3$

4) A line has slope  $-2$ . Which pair of points could lie on this line?

☐ A. (1, 3) and (2, 5)

☐ B. (0, 4) and (2, 0)

☐ C. (1, 1) and (3, 1)

☐ D. (2, 5) and (3, 4)

5) How much of a 100% alcohol solution must be mixed with 500 mL of 20% alcohol solution to create a 50% solution?

☐ A. 100 mL

☐ B. 200 mL

☐ C. 300 mL

☐ D. 400 mL



Scan me!  
For more practice  
& answers

6) The function  $f(x)$  represents postage cost based on weight in ounces:  $f(x) =$

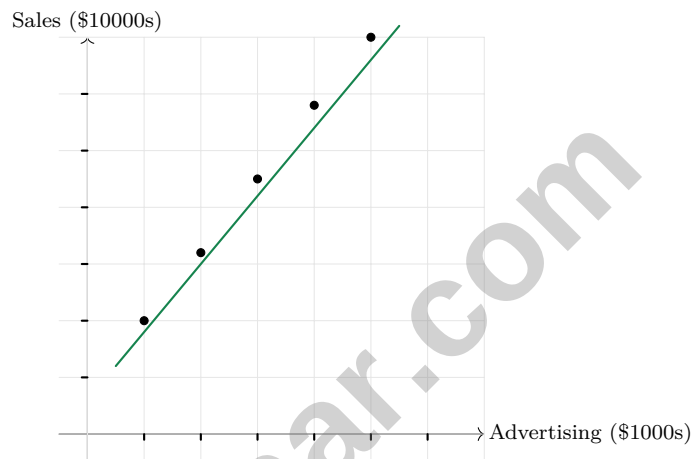
$$\begin{cases} 0.55 & \text{if } 0 < x \leq 1 \\ 0.75 & \text{if } 1 < x \leq 2 \\ 0.95 & \text{if } 2 < x \leq 3 \end{cases}$$

What is  $f(1.5)$ ?

☐ A. \$0.55

☐ C. \$0.95

☐ B. \$0.75

☐ D. \$1.50


7)

A business tracks advertising spend vs. sales. The model is  $S = 1.1a + 0.8$ , where  $S$  is sales and  $a$  is advertising. What does the 0.8 intercept tell you?

☐ A. Sales decrease by \$0.80 per \$1000 ad spend

☐ C. The company spends \$800 on advertising initially

☐ B. Base sales of \$8000 occur with zero ad spend

☐ D. Maximum possible sales are \$8000

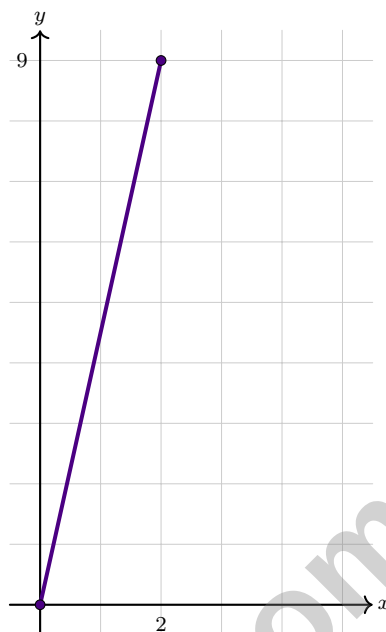

- 1) The table shows a linear function  $m(x)$ :

|        |   |    |   |    |
|--------|---|----|---|----|
| $x$    | 0 | 2  | 4 | 6  |
| $m(x)$ | 5 | 11 | ? | 23 |

What is  $m(4)$ ?

- ☐ A. 15                                      ☐ C. 17  
☐ B. 16                                      ☐ D. 18
- 2) A principal of \$5,000 is invested at 6% compound interest annually for 2 years. What is the total amount?
- ☐ A. \$5,300                                      ☐ C. \$5,618  
☐ B. \$5,600                                      ☐ D. \$5,900
- 3) The area of a square is  $A = s^2$ . If you square the side length, what is the area of the new square in terms of  $s$ ?
- ☐ A.  $s^2$                                       ☐ C.  $(s^2)^2 = s^4$   
☐ B.  $s^3$                                       ☐ D.  $2s^2$
- 4) What is  $\sqrt{169}$ ?
- ☐ A. 12                                      ☐ C. 14  
☐ B. 15                                      ☐ D. 13
- 5) Express 356,000 in scientific notation.





6)

The constant of proportionality for this line is:

☐ A.  $\frac{2}{9}$

☐ C. 2

☐ B. 9

☐ D.  $\frac{9}{2}$

7) Convert  $0.454545\ldots$  to a fraction in simplest form.8) Factor completely:  $x^3 + 5x^2$ .

☐ A.  $x^2(x + 5)$

☐ C.  $5x(x^2 + x)$

☐ B.  $x(x^2 + 5x)$

☐ D.  $x(x + 5)^2$



Scan me!  
For more practice  
& answers

+ -

.....

83

.....

× ÷

Testinar.com

**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.**

Testinar.com



## Practice Test Answers and Explanations

### Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.1.1.5)  $57,000 = 5.7 \times 10^4$  (move decimal 4 places left from 57,000 to get 5.7).
- 2) **Choice C is correct.** (8.2.2.1) Difference of squares:  $(x+3)^2 - (x-3)^2 = [(x+3) + (x-3)][(x+3) - (x-3)] = (2x)(6) = 12x$ .
- 3) **Choice B is correct.** (8.2.2.2)  $S(0) = 500$ . Table shows 600 at  $m = 0$ . Since  $600 > 500$ , table function starts higher.
- 4) **The correct answer is (5, 3).** (8.2.4.7) Add the two equations to eliminate  $y$ :  $(x+y) + (x-y) = 8+2$ , so  $2x = 10$ , giving  $x = 5$ . Substitute into the first equation:  $5 + y = 8$ , so  $y = 3$ .
- 5) **Choice C is correct.** (8.2.2.2) From (1, 1) to (3, 4): slope  $= \frac{4-1}{3-1} = \frac{3}{2}$ .
- 6) **Choice A is correct.** (8.2.4.8) Let  $s$  = shortest side. Then the three sides are  $s$ ,  $s+2$ , and  $s+4$ . Perimeter:  $s + (s+2) + (s+4) = 18$ , so  $3s + 6 = 18$ , giving  $s = 4$  cm.
- 7) **Choice A is correct.** (8.2.1.1) Substitute  $x = 5$ :  $f(5) = 3(5) - 2 = 15 - 2 = 13$ .
- 8) **Choice C is correct.** (8.4.1.2) Set  $P = 500$ :  $500 = 3.2c - 250 \Rightarrow 3.2c = 750 \Rightarrow c = \frac{750}{3.2} \approx 234.4$ . Since cakes are whole items, the bakery must sell at least 235 cakes.
- 9) **Choice B is correct.** (8.2.2.4) The change in slope (from  $3/4$  to  $(4.5-3)/(7-4) = 0.5$  per meter) indicates a change in the rate structure. Option B explains why: different geological layers can cost differently. A is wrong because the slope changes, C is wrong because the line continues, and D is wrong because the slope stays positive.
- 10) **The correct answer is \$35.** (8.2.1.1) Compute  $25 + 0.10(100) = 35$ .
- 11) **Choice B is correct.** (8.3.2.2) Add 3 to each  $x$ -coordinate and subtract 2 from each  $y$ -coordinate:  $(1+3, 1-2) = (4, -1)$ ,  $(4+3, 1-2) = (7, -1)$ ,  $(2+3, 3-2) = (5, 1)$ .
- 12) **Choice A is correct.** (8.3.2.2) A dilation by scale factor  $k$  maps  $(x, y) \rightarrow (kx, ky)$ . With  $k = \frac{1}{2}$ :  $(8, -6) \rightarrow (4, -3)$ .
- 13) **Choice B is correct.** (8.3.2.2) The exterior angle at  $C$  is  $123^\circ$ , so the interior angle  $\angle ACD = 180 - 123 = 57^\circ$ .
- 14) **Choice B is correct.** (8.3.1.1) Verify:  $121 + 3600 = 3721 = 61^2$ . This is the 11-60-61 Pythagorean triple.
- 15) **Choice A is correct.** (8.3.1.2)  $d = \sqrt{(4-0)^2 + (0-3)^2} = \sqrt{16+9} = \sqrt{25} = 5$ .
- 16) **Choice B is correct.** (8.3.2.1) Corresponding angles formed by a transversal cutting parallel lines are congruent. So  $n = 48^\circ$ .
- 17) **Choice A is correct.** (8.3.2.1) Original:  $V = \frac{1}{3}Bh$ . New:  $V' = \frac{1}{3}(2B) \times \frac{h}{2} = \frac{1}{3}Bh = V$ . Volume is unchanged.
- 18) **The correct answer is A, D.** (8.2.2.2) The line goes through (0, 0) and (8, 4), so the slope and constant of proportionality are  $\frac{4}{8} = 0.5$ . A point on the line must have  $y = 0.5x$ ; when  $x = 6$ ,  $y = 3$ , so (6, 3) is on the line.
- 19) **Choice B is correct.** (8.3.1.1) L-shape overlap requires subtracting the shared region. Total area  $= 50 + 48 - 20 = 78$  m<sup>2</sup>. Option A forgets the overlap; C is perimeter; D is diagonal length.
- 20) **Choice A is correct.** (8.3.2.2) Using  $\frac{(n-2) \times 180}{n} = 108$ :  $(n-2) \times 180 = 108n \Rightarrow 180n - 360 = 108n \Rightarrow 72n = 360 \Rightarrow n = 5$ .
- 21) **Choice B is correct.** (8.4.1.3) Row-conditional frequencies correctly compare completion within each group: salaried employees complete at 80%, hourly at 70%. Option B divides by the row total for each group, which is the proper method for conditional comparison.
- 22) **Choice D is correct.** (8.3.1.2) If MAD = 0, every value must equal the mean exactly, which happens only when all values are the same.
- 23) **Choice D is correct.** (8.3.1) Numbers less than 4: 1, 2, 3. Rolling a 2 is already included in that set. So favorable outcomes: 1, 2, 3 = 3 outcomes.  $P = \frac{3}{6} = \frac{1}{2}$ .
- 24) **Choice B is correct.** (8.3.2.2) Each of the 4 morning branches splits into 3 afternoon branches:  $4 \times 3 = 12$  final outcomes.
- 25) **Choice C is correct.** (8.4.1.1) Most students show: more TV  $\rightarrow$  lower GPA. This student breaks that pattern with high TV but also high GPA, making this point an outlier that deviates from the trend.
- 26) **Choice C is correct.** (8.4.1.2) A line of best fit minimizes the overall distance between itself and the data points, capturing the general trend. It rarely passes through every point.



## Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 5 full Grade 8 practice tests, and that repeated effort matters. ★

### Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

**Grade 8 test-day tip:** When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

If you want to share something or ask a question, please email me at [jay@testinar.com](mailto:jay@testinar.com).

**Jay Daie**

Your Persistence Coach

# Practice Today. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 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 |
| ✓ Measurement & Data                  | ✓ And More!                |

**5**  
PRINTED  
TESTS



**2** ONLINE  
TESTS



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