

# 3

West Virginia

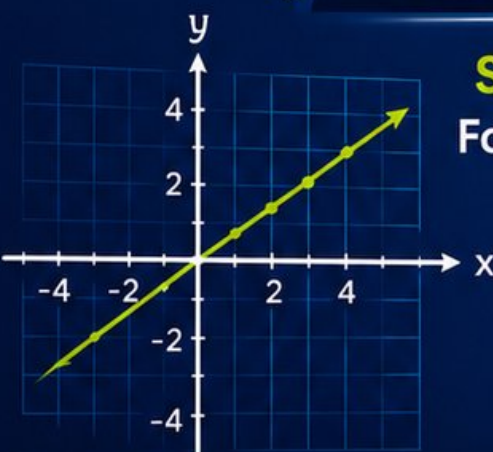
WVGSA

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



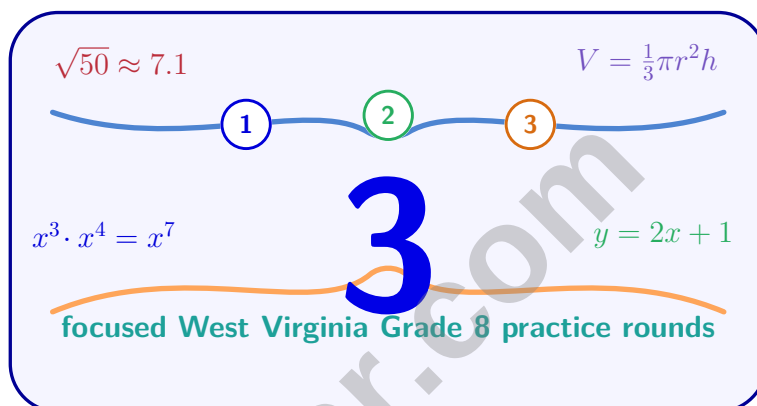
**2** ONLINE TESTS



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

# 3 West Virginia WVGSA Grade 8 Math Practice Tests

*Focused Practice for WVGSA Grade 8 Math Readiness*



Three complete 40-question Grade 8 WVGSA 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, West Virginia Grade 8 Problem Solver!

Three focused rounds for sharper WVGSA math thinking

This book gives you three full Grade 8 WVGSA 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 West Virginia 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.

**West Virginia 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 WVGSA 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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& answers

# Table of Contents



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1) The best-fit line for a summer temperature study is  $T = 1.2m + 68$ , where  $T$  is temperature in  $^{\circ}\text{F}$  and  $m$  is the month number (with month 1 = June). What does the intercept of 68 represent in this context?

- ☐ A. The predicted temperature at month 0 (an extrapolated value)
- ☐ B. The temperature increase per month
- ☐ C. The maximum temperature observed
- ☐ D. The rate of temperature change

2) A cylindrical grain silo has a diameter of 10 feet and a height of 20 feet. The curved exterior wall must be painted. If paint costs \$2 per square foot, what is the total cost of paint needed? (Use  $\pi \approx 3.14$ .)

- ☐ A. \$314
- ☐ B. \$628
- ☐ C. \$1,256
- ☐ D. \$1,570

3) The points  $(-2, -5)$ ,  $(0, -1)$ , and  $(2, 3)$  lie on the same line. What is the  $y$ -intercept?

- ☐ A.  $-5$
- ☐ B.  $-2$
- ☐ C.  $-1$
- ☐ D.  $2$

4) Two students solve  $2x + 5 = 11$  and get different answers: Student A gets  $x = 3$  and Student B gets  $x = 4$ . Without solving, how can you determine which student is correct?

- ☐ A. Substitute each value into the original equation to check which one works
- ☐ B. Solve the equation and see who matched your answer
- ☐ C. Check which value is smaller
- ☐ D. Divide 11 by 2 to see which is closer



- 5) A quadrilateral is rotated  $270^\circ$  clockwise about the origin. This is equivalent to a counterclockwise rotation of how many degrees?
- ☐ A.  $90^\circ$  ☐ C.  $270^\circ$   
☐ B.  $180^\circ$  ☐ D.  $360^\circ$
- 6) A cylinder has a volume of  $1256 \text{ cm}^3$  and radius of 10 cm. What is its height? (Use  $\pi \approx 3.14$ .)
- ☐ A. 4 cm ☐ C. 8 cm  
☐ B. 6 cm ☐ D. 12 cm
- 7) Marco deposits \$1,500 at an annual simple-interest rate of 4%. How much interest does he earn after 2 years?
- ☐ A. \$60 ☐ C. \$240  
☐ B. \$150 ☐ D. \$120
- 8) Which law does this diagram represent?

Same base  $\rightarrow$  Add the exponents

$$x^m \cdot x^n = x^{m+n}$$

Example:  $2^3 \times 2^4 = 2^{3+4} = 2^7$   
 Same base required.

Which of the following uses this same law?

- ☐ A.  $(5a)^2 = 25a^2$  ☐ C.  $2^4 \cdot 2^5 = 2^9$   
☐ B.  $\frac{p^7}{p^3} = p^4$  ☐ D.  $(y^3)^4 = y^{12}$



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9) What is  $\sqrt[3]{1728}$ ?

☐ A. 10

☐ C. 12

☐ B. 11

☐ D. 13

10) Express 356,000 in scientific notation.

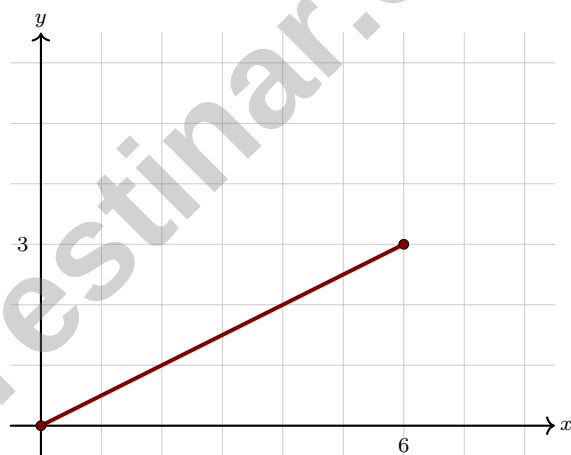
11)  $\frac{1.2 \times 10^4}{4 \times 10^6} = ?$

☐ A.  $0.3 \times 10^{-2}$

☐ C.  $3.2 \times 10^{-2}$

☐ B.  $5 \times 10^{-3}$

☐ D.  $3 \times 10^{-3}$



12)

What is the unit rate shown in the graph?

☐ A. 3 units of  $y$  per unit of  $x$

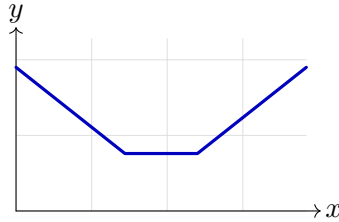
☐ C.  $\frac{1}{2}$  unit of  $y$  per unit of  $x$

☐ B. 2 units of  $y$  per unit of  $x$

☐ D. 6 units of  $y$  per unit of  $x$



- 1) An elevator moves: down for 10 seconds, stops for 5 seconds, up for 8 seconds. Sketch the height-vs.-time graph. Which shape describes it?



- ☐ A. Three straight segments: decreasing, flat, increasing  
☐ B. One decreasing line across all time  
☐ C. One increasing line across all time  
☐ D. A parabola opening upward
- 2) Convert  $0.\overline{7}$  to a fraction. Which step is incorrect?
- ☐ A. Let  $x = 0.\overline{7}$ .  
☐ B.  $10x = 7.\overline{7}$ .  
☐ C.  $10x - x = 7.\overline{7} - 0.\overline{7} = 7$  is wrong; should be 0.7.  
☐ D.  $9x = 7$ , so  $x = \frac{7}{9}$ .
- 3) To the nearest whole number,  $\sqrt{30} \approx$ ?
- ☐ A. 7  
☐ B. 6  
☐ C. 4  
☐ D. 5
- 4) What is 0.00056 in scientific notation?
- ☐ A.  $56 \times 10^{-5}$   
☐ B.  $5.6 \times 10^{-5}$   
☐ C.  $5.6 \times 10^4$   
☐ D.  $5.6 \times 10^{-4}$



5) Which is the best estimate of  $\frac{\pi}{\sqrt{2}}$ ?

☐ A. 1.5

☐ C. 3.1

☐ B. 4.4

☐ D. 2.2

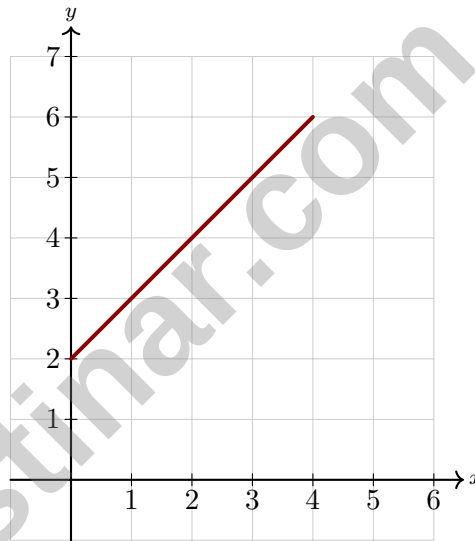
6) A cylinder has radius 4 cm and height 9 cm. What is the difference between total surface area and lateral surface area?

☐ A.  $32\pi \text{ cm}^2$

☐ C.  $72\pi \text{ cm}^2$

☐ B.  $16\pi \text{ cm}^2$

☐ D.  $40\pi \text{ cm}^2$



7)

What is the  $y$ -intercept of the line shown?

☐ A. 1

☐ C. 3

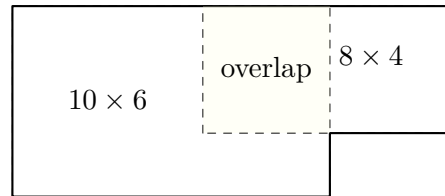
☐ B. 4

☐ D. 2



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- 1) A floor plan is an L-shaped figure made of two rectangles: one is 10 ft by 6 ft, the other is 8 ft by 4 ft. The rectangles overlap in a 4 ft by 4 ft region. What is the total floor area?



- ☐ A.  $60 \text{ ft}^2$ 
☐ C.  $84 \text{ ft}^2$   
☐ B.  $76 \text{ ft}^2$ 
☐ D.  $92 \text{ ft}^2$
- 2)
- 
- Which is the BEST description of a “line of best fit” on a scatter plot?
- ☐ A. A line that passes through every data point  
☐ B. A line that passes through no data points  
☐ C. A line that generally shows the overall trend of the data  
☐ D. A line that only passes through the outliers
- 3) Trapezoid  $PQRS$  is similar to Trapezoid  $TUVW$  with scale factor  $\frac{3}{2}$ . If  $PQ = 8 \text{ cm}$  in trapezoid  $PQRS$ , what is the length of  $TU$  in trapezoid  $TUVW$ ?

- ☐ A. 12 cm
 ☐ C. 8 cm  
☐ B. 5.33 cm
 ☐ D. 10.67 cm



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& answers

4) A student evaluated  $f(x) = 3x + 2$  at  $x = 4$  and wrote  $f(4) = 3 + 2 + 4 = 9$ . What error did the student make?

- ☐ A. Did not multiply  $x$  by the coefficient 3
- ☐ B. Multiplied 3 by 4 correctly but made an arithmetic mistake
- ☐ C. Added the constant instead of substituting correctly
- ☐ D. The answer is correct

5) Which number can be expressed as a fraction?

- ☐ A.  $\sqrt{11}$
- ☐ B.  $2\pi$
- ☐ C.  $\frac{8}{3}$
- ☐ D.  $\sqrt{2} + 1$

6) Convert  $0.\overline{27}$  to a fraction in simplest form.

- ☐ A.  $\frac{27}{100}$
- ☐ B.  $\frac{27}{99}$
- ☐ C.  $\frac{27}{90}$
- ☐ D.  $\frac{5}{18}$

7) A piggy bank has nickels and dimes totaling \$2.75. There are twice as many dimes as nickels. How many nickels are in the bank?

8) Is  $\sqrt{27}$  greater than or less than 5.2?

- ☐ A. Cannot be determined
- ☐ B. Equal to
- ☐ C. Less than
- ☐ D. Greater than



**West Virginia WVGSA 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 West Virginia WVGSA practice test.**

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## Practice Test Answers and Explanations

### Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (M.8.30) The  $y$ -intercept (68) is the predicted value when  $m = 0$ . Since month 0 is outside the observed summer data range, this is an extrapolation used to define the line mathematically.
- 2) **Choice C is correct.** (M.8.27) Radius  $r = 5$  feet. Lateral (curved) surface area  $= 2\pi rh = 2(3.14)(5)(20) = 628$  sq. ft. Cost  $= 628 \times \$2 = \$1,256$ .
- 3) **Choice C is correct.** (M.8.8) When  $x = 0$ ,  $y = -1$ . The  $y$ -intercept is the  $y$ -coordinate when  $x = 0$ .
- 4) **Choice A is correct.** (M.8.9) Substitution is the definitive test:  $2(3) + 5 = 11$  ✓ and  $2(4) + 5 = 13 \neq 11$  ✗. Student A is correct.
- 5) **Choice A is correct.** (M.8.19) Clockwise and counterclockwise are opposite directions.  $270^\circ$  clockwise  $= 360^\circ - 270^\circ = 90^\circ$  counterclockwise.
- 6) **Choice A is correct.** (M.8.27) From  $V = \pi r^2 h$ :  $1256 = 3.14 \times 100 \times h \Rightarrow h = \frac{1256}{314} = 4$  cm.
- 7) **Choice D is correct.** (M.8.25) Simple interest:  $I = Prt = 1500 \times 0.04 \times 2 = \$120$ . Distractor A is 1-year interest; C is double (wrong time calc); D confuses principal.
- 8) **Choice C is correct.** (M.8.3) The diagram shows the product rule (add exponents). (C) uses it:  $2^{4+5} = 2^9$ . (A) is power of product, (B) is quotient rule, (D) is power of power.
- 9) **Choice C is correct.** (M.8.4)  $12 \times 12 \times 12 = 1728$ , so  $\sqrt[3]{1728} = 12$ .
- 10) **The correct answer is  $3.56 \times 10^5$ .** (M.8.5) Move the decimal 5 places left to get 3.56; since the original number is greater than 1, the exponent is positive 5.
- 11) **Choice D is correct.** (M.8.6) Divide coefficients:  $1.2 \div 4 = 0.3 = 3 \times 10^{-1}$ . Subtract exponents:  $10^{4-6} = 10^{-2}$ . Combine:  $3 \times 10^{-1} \times 10^{-2} = 3 \times 10^{-3}$ .
- 12) **Choice C is correct.** (M.8.7) Unit rate is slope:  $\frac{3}{6} = \frac{1}{2}$ . For every 1 unit of  $x$ ,  $y$  increases by  $\frac{1}{2}$ .
- 13) **Choice D is correct.** (M.8.10) The first two systems are lines with different equations but the same form (both are  $x = 2$  or  $y = 4$ , not two distinct lines). Option C has parallel lines (same slope, different intercepts). Option D has different slopes, so the lines intersect at exactly one point.
- 14) **Choice A is correct.** (M.8.12) Add 8 to both sides:  $x \leq -2 + 8 = 6$ .
- 15) **Choice A is correct.** (M.8.9) FOIL:  $(x + 2)(x + 6) = x^2 + 6x + 2x + 12 = x^2 + 8x + 12$ .
- 16) **Choice C is correct.** (M.8.26) Dashed lines correspond to STRICT inequalities ( $<$  and  $>$ ), which do not include the boundary. The symbols  $\leq$  and  $\geq$  use solid lines.
- 17) **The correct answer is  $\frac{1}{3}$ .** (M.8.19) Let  $x = 0.\bar{3}$ . Then  $10x = 3.\bar{3}$ , so  $9x = 3$  and  $x = \frac{1}{3}$ .
- 18) **Choice B is correct.** (M.8.14) Base fare is \$5. Charge per mile is \$3. Total charge  $= 3m + 5$ .
- 19) **The correct answer is A, C.** (M.8.1)  $\sqrt{169} = 13$  is rational (perfect square). The repeating decimal  $0.777\ldots = \frac{7}{9}$  is rational. The other values are irrational:  $\sqrt{170}$  (non-perfect square),  $2\pi$  (irrational multiple of  $\pi$ ), and  $\sqrt{2} + 1$  (irrational plus rational is irrational).
- 20) **Choice A is correct.** (M.8.2) Rate for Table 1:  $(5 - 1)/(2 - 0) = 2$ . Rate for Table 2:  $(-1 - (-2))/(1 - 0) = 1$ . Since  $2 > 1$ , Table 1 is steeper.
- 21) **Choice B is correct.** (M.8.14)  $y = \frac{1}{3}x + 5$  is linear because it matches the form  $y = mx + b$  with  $m = \frac{1}{3}$  and  $b = 5$ . Different slopes are still linear.
- 22) **Choice B is correct.** (M.8.17) Linear functions have constant slope. Option B: slope from 1 to 2 is  $\frac{8-5}{1} = 3$ ; from 2 to 3 is  $\frac{11-8}{1} = 3$ . Constant, so linear.
- 23) **Choice B is correct.** (M.8.20) Congruent figures have equal corresponding sides. Kite 2 has the same side lengths as Kite 1: 4 cm, 4 cm, 6 cm, 6 cm.
- 24) **Choice A is correct.** (M.8.21) The  $y$ -coordinate stays the same while the  $x$ -coordinate negates. This is reflection across the  $y$ -axis:  $(x, y) \rightarrow (-x, y)$ .
- 25) **Choice A is correct.** (M.8.23) Corresponding angles are equal:  $6y + 12 = 3y + 51$ , so  $3y = 39$  and  $y = 13$ .
- 26) **The correct answer is (6, 7).** (M.8.2)  $6^2 = 36$  and  $7^2 = 49$ . Since  $36 < 45 < 49$ , we have  $6 < \sqrt{45} < 7$ .
- 27) **Choice B is correct.** (M.8.24, M.8.25) Verify:  $121 + 3600 = 3721 = 61^2$ . This is the 11-60-61 Pythagorean triple.



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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](mailto: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.

[testinar.com/math8](https://testinar.com/math8)

## PRACTICE. PREPARE. SUCCEED.



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More Practice. More Confidence.  
Better **Results**.