

WEST VIRGINIA

WVGSA

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



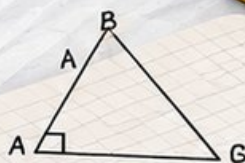
2

 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.



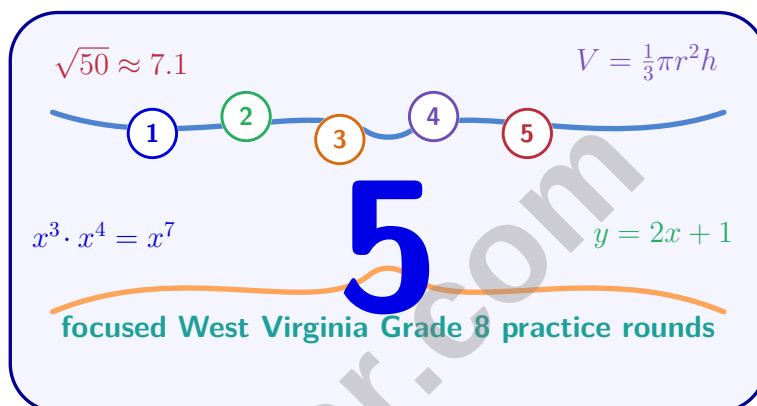
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 West Virginia WVGSA Grade 8 Math Practice Tests

Five WVGSA Rounds for Clear Grade 8 Math Review



Five 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!

Five focused rounds for sharper WVGSA math thinking

This book gives you five 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 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.

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?

Five WVGSA 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.



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& answers

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1)

Temperature (°C)	15	18	21	24	27
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Five days with temperatures shown. Mean = 21°C. Find MAD.

☐ A. 2.4

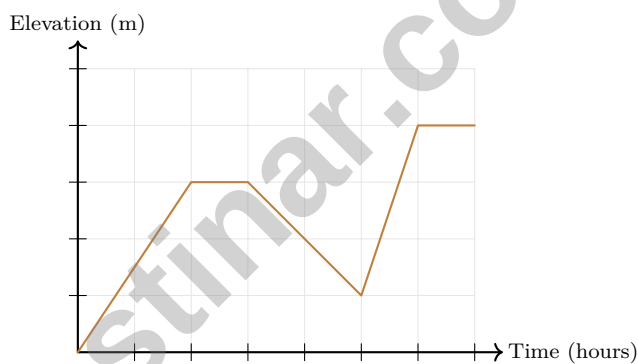
☐ C. 3.6

☐ B. 3

☐ D. 6

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

3)



A hiker starts at sea level. Which part of the journey involves going downhill?

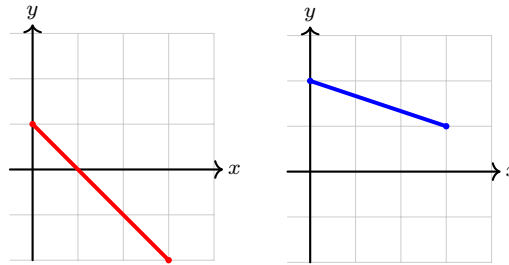
☐ A. From 0 to 2 hours

☐ C. From 3 to 5 hours

☐ B. From 2 to 3 hours

☐ D. From 5 to 7 hours


- 4) Which graph best represents a line with slope $-\frac{1}{3}$?



- ☐ A. Red line (left)
 ☐ C. Both have slope $-\frac{1}{3}$
- ☐ B. Neither has slope $-\frac{1}{3}$
☐ D. Blue line (right)
- 5) Solve $-4(x + 1) < 12$. What is the boundary value?

- 6) A restaurant has 50 tables. Small tables seat 2 people; large tables seat 4 people. To seat at least 160 people, how many large tables are needed at minimum?

- ☐ A. 20
 ☐ C. 30
- ☐ B. 25
 ☐ D. 35

- 7) Rectangle X is similar to Rectangle Y . Rectangle X has perimeter 20 m. Rectangle Y has perimeter 50 m. What is the ratio of the side lengths (X to Y)?

- ☐ A. 2 : 5
 ☐ C. 5 : 2
- ☐ B. 4 : 25
 ☐ D. 25 : 4



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8) Given $f(x) = 2x - 5$, what is $f(4)$?

☐ A. 11

☐ C. -1

☐ B. 3

☐ D. 13

9) $\alpha(x) = -3x + 12$ and β table $(0, 12), (2, 6), (4, 0)$. Related how?

x	0	2	4
$\beta(x)$	12	6	0

☐ A. Identical

☐ C. Different slopes.

☐ B. Same slope, different intercepts.

☐ D. Cannot be determined.

10) Which equation represents a NONLINEAR function?

☐ A. $y = 2x + 3$

☐ C. $y = x^2 + 1$

☐ B. $y = -x + 5$

☐ D. $y = \frac{1}{2}x - 7$

11) A plant grows such that its height is modeled by $h = 2t + 15$, where h is height in cm and t is time in weeks. Interpret the meaning of the number 2 in this equation.

☐ A. The plant starts at a height of 2 cm.

☐ C. The plant reaches a height of 2 cm.

☐ D. The plant grows for 2 weeks total.

☐ B. The plant grows 2 cm per week.



1) Solve: $3(x + 2) < 9$

☐ A. $x < 1$

☐ C. $x < 3$

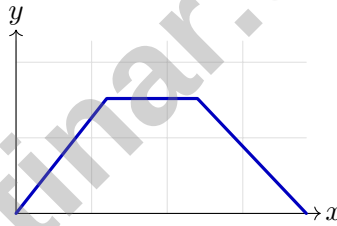
☐ B. $x > 1$

☐ D. $x > 3$

2) Why is the vertical line test a valid way to determine if a graph is a function?

- ☐ A. Because vertical lines represent inputs, and if one vertical line intersects the graph more than once, one input has multiple outputs.
- ☐ B. Because functions must have vertical lines in their graphs.
- ☐ C. Because every function is a straight line.
- ☐ D. Because the y -intercept determines if it is a function.

3) A graph of a function shows distance from home (in miles) vs. time. The graph rises, then is flat, then falls. Which real-world scenario matches?



- ☐ A. Drive somewhere, stop, then drive home
- ☐ B. Walk faster and faster until stopping
- ☐ C. Stay home, then drive faster
- ☐ D. Drive home directly from work

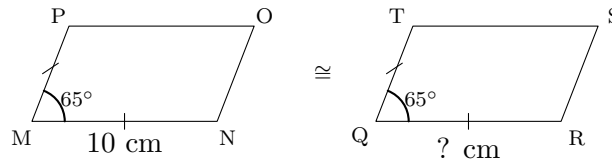


- 4) A swimming pool is being drained. The water level drops $\frac{1}{2}$ foot every $\frac{1}{4}$ hour. What is the slope?
- ☐ A. -2 feet per hour
☐ B. 2 feet per hour
☐ C. $-\frac{1}{8}$ feet per hour
☐ D. $\frac{1}{8}$ feet per hour
- 5) A 300 mL mixture contains 40% juice and 60% water. How much pure juice must be added to make the mixture 60% juice?
- ☐ A. 75 mL
☐ B. 100 mL
☐ C. 150 mL
☐ D. 200 mL
- 6) Triangle ABC is similar to Triangle DEF . Side $AB = 4$ cm, $BC = 5$ cm, $CA = 6$ cm. The perimeter of DEF is 45 cm. Find the length of EF .
- ☐ A. 15 cm
☐ B. 18 cm
☐ C. 22.5 cm
☐ D. 10 cm
- 7) Simplify $\frac{x^{10} \cdot x^{-3}}{x^4}$. What is the exponent on x in the final answer?



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- 1) Parallelogram MNOP is congruent to parallelogram QRST. In parallelogram MNOP, $MN = 10$ cm and $\angle M = 65^\circ$. Which statement is true?



- ☐ A. $QR = 10$ cm and $\angle Q = 115^\circ$
☐ C. $QR = 20$ cm and $\angle Q = 65^\circ$
☐ B. $QR = 10$ cm and $\angle Q = 65^\circ$
☐ D. QR cannot be determined
- 2) A store advertises: “Pay \$250 down and \$150/month for 12 months.” If the item costs \$1,500 cash, what is the finance charge?
- ☐ A. \$0
 ☐ C. \$100
☐ B. \$50
 ☐ D. \$550
- 3) Which expression equals 2^{10} ?
- ☐ A. $2^5 + 2^5$
☐ C. $(2^5)^2$
☐ B. $2^6 + 2^4$
☐ D. $2^{15} \div 2^6$
- 4) If $x^3 = 512$, what is x ?
- ☐ A. 7
 ☐ C. 9
☐ B. 10
 ☐ D. 8
- 5) Which equation does NOT represent a proportional relationship?
- ☐ A. $y = 3x$
☐ C. $y = x$
☐ B. $y = -2x$
☐ D. $y = 2x + 1$



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6) Which table represents a function where the output is always greater than the input?

Table A:	x	1	2	3	4
	y	3	5	7	9

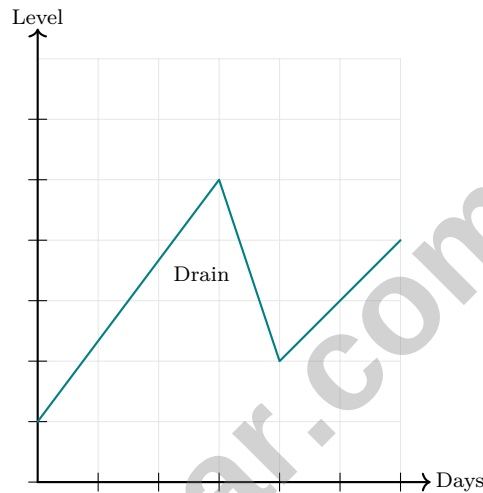
Table B:	x	0	1	2	3
	y	0	2	4	6

☐ A. Neither table.

☐ C. Table B only.

☐ B. Table A only.

☐ D. Both tables.



7)

A water tank fills, then drains, then fills again. Based on the graph:

- ☐ A. The tank drains from day 1 to day 3
- ☐ B. The tank drains from day 3 to day 3
- ☐ C. The tank drains from day 3 to day 4
- ☐ D. The tank never fills again after day 3

8) A temperature drops 4 degrees every 2 hours. What is the slope?

- ☐ A. $\frac{1}{2}$ degrees per hour
- ☐ B. 4 degrees per hour
- ☐ C. 2 degrees per hour
- ☐ D. -2 degrees per hour



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 C is correct.** (M.8.26) Absolute deviations: $|15-21| = 6$, $|18-21| = 3$, $|21-21| = 0$, $|24-21| = 3$, $|27-21| = 6$. Sum = 18. MAD = $18/5 = 3.6$.
- 2) **The correct answer is (5, 3).** (M.8.10) 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 $y = 3$.
- 3) **Choice C is correct.** (M.8.18) From 3 to 5 hours, the elevation drops from 3m to 1m, indicating a downhill segment (decreasing function).
- 4) **Choice D is correct.** (M.8.2) Red line: slope = $\frac{-2-1}{3-0} = \frac{-3}{3} = -1$. Blue line: slope = $\frac{1-2}{3-0} = \frac{-1}{3} = -\frac{1}{3}$. The blue line matches the target slope.
- 5) **The correct answer is -4 .** (M.8.12) Solving gives $x > -4$, so the boundary value is -4 .
- 6) **Choice C is correct.** (M.8.9) Let l = large tables, so $50-l$ tables are small. The seating capacity is $4l + 2(50-l) = 100 + 2l$. Solve $100 + 2l \geq 160$, giving $2l \geq 60$ and $l \geq 30$.
- 7) **Choice A is correct.** (M.8.22) Perimeter scales linearly with side lengths. Ratio of perimeters equals ratio of corresponding sides: $\frac{20}{50} = \frac{2}{5}$.
- 8) **Choice B is correct.** (M.8.19) Substitute $x = 4$: $f(4) = 2(4) - 5 = 8 - 5 = 3$.
- 9) **Choice A is correct.** (M.8.2) β slope: $(6 - 12)/2 = -3$. Using $(0, 12)$: $\beta(x) = -3x + 12$. Same as α .
- 10) **Choice C is correct.** (M.8.14) A linear function has the form $y = mx + b$ (no powers of x other than 1). $y = x^2 + 1$ has a squared variable, making it nonlinear.
- 11) **Choice B is correct.** (M.8.17) In $h = mt + b$, the slope $m = 2$ represents the rate of change: 2 cm per week. The number 15 is the initial height (intercept).
- 12) **Choice A is correct.** (M.8.20) Since triangle XYZ is congruent to triangle UVW, triangle UVW must have sides 5 cm, 7 cm, and 9 cm, not 10 cm. The student made an error by changing one of the side lengths.
- 13) **Choice A is correct.** (M.8.21) Reflection across $y = x$ swaps coordinates: $(x, y) \rightarrow (y, x)$. So $(-3, 2) \rightarrow (2, -3)$.
- 14) **Choice A is correct.** (M.8.23) Alternate exterior angles are congruent when lines are parallel.
- 15) **The correct answer is 20.** (M.8.9) Compute $9(2)^2 - 16 = 36 - 16 = 20$.
- 16) **Choice B is correct.** (M.8.24, M.8.25) Error analysis: Verify using the converse. $16 + 25 = 41$ but $36 \neq 41$, so this is NOT a right triangle.
- 17) **Choice B is correct.** (M.8.26) This forms a 3-4-5 right triangle. The hypotenuse (ladder length) is $\sqrt{3^2 + 4^2} = \sqrt{9 + 16} = 5$ feet.
- 18) **Choice C is correct.** (M.8.25) Angles on a straight line sum to 180° . The third angle is $180 - 42 - 85 = 53^\circ$.
- 19) **Choice C is correct.** (M.8.27) $V = \frac{1}{3} \times B \times h \Rightarrow 500 = \frac{1}{3} \times 100 \times h \Rightarrow h = 15$ m.
- 20) **Choice C is correct.** (M.8.25) Rectangle area = $7 \times 5 = 35 \text{ in}^2$. Triangle area = $\frac{1}{2} \times 7 \times 3 = 10.5 \text{ in}^2$. Total = $35 + 10.5 = 45.5 \text{ in}^2$.
- 21) **Choice C is correct.** (M.8.23) Each exterior angle of a regular hexagon: $\frac{360}{6} = 60^\circ$.
- 22) **The correct answer is A,D.** (M.8.7) 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.
- 23) **Choice A is correct.** (M.8.28) When points are scattered randomly with no visible trend or direction, there is no correlation. An upward trend, downward trend, or tight line all indicate some form of correlation.
- 24) **Choice A is correct.** (M.8.31) Joint frequency is the intersection count divided by the grand total: $\frac{63}{150} = \frac{21}{50} = 0.42$.
- 25) **Choice B is correct.** (M.8.25) Not Y: X or Z. Total degrees: 360° . Not Y: $120 + 120 = 240$. $P = \frac{240}{360} = \frac{2}{3}$.
- 26) **Choice B is correct.** (M.8.26) Two morning choices times three afternoon choices: $2 \times 3 = 6$ possible schedules.
- 27) **Choice B is correct.** (M.8.29) Both have slope $m = -2$ but intercepts of 5 and -3 respectively. These are parallel lines.



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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.

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.