

# 10 Full-Length West Virginia Math III Practice Tests

*Complete Test Prep with Detailed Answer Explanations*

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Published by View Math Education

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# Welcome to Your Practice Book

10 full-length Algebra 2 tests for complete practice and endurance

## Welcome!

This book gives you **10 full-length Algebra 2 practice tests** with detailed answer explanations. Treat each test as a complete practice cycle: work carefully, check your score, review mistakes, and return to the next test with a clearer plan.

### Practice routine

- ✓ Take each test in one quiet sitting
- ✓ Use a timer and avoid notes
- ✓ Mark questions you want to revisit

### Improve your score

- ✓ Review every missed question
- ✓ Write down the mistake pattern
- ✓ Practice that kind of problem again

Ten tests give you room to practice, reset, and finish stronger.

1  
Diagnose

2  
Train

3  
Finish

“ Build endurance by taking full tests under timed conditions, then use the explanations for focused review. ”





# How to Use This Book



A complete 10-test Algebra 2 preparation program

## What is inside

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### 10 full-length practice tests

Each test samples the full Algebra 2 course: functions, quadratics, polynomials, rational and radical expressions, exponentials, logarithms, sequences, matrices, trigonometry, conics, statistics, probability, and finance.

### Detailed answer explanations

Review each mistake until you can explain the method without looking.

### Reference sheet and score tracker

Use formulas before the test, then track scores and save progress online after each test.

## Question types

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### Multiple Choice

Solve first, then match. Check restrictions and units before choosing.

### Short Answer

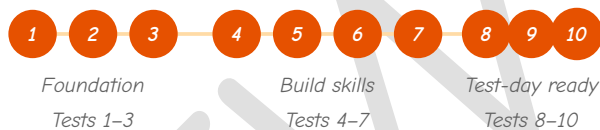
Show equations, substitutions, simplification, and the final conclusion.

### Graphing & Data

Use labels and scale. Explain what intercepts, extrema, or trends mean.

## Ten-test rhythm

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**Suggested pacing:** Take one test every 3–4 days, or one per week. Use the time between tests for targeted review, not more guessing.

1

### Score

Mark every answer.

2

### Study

Review missed topics.

3

### Retry

Redo similar problems.

# 💡 Test-Taking Tips 💡

Practical habits for Algebra 2 practice tests

## During the test

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### 1. Read for the target.

Identify exactly what the question asks before calculating.

### 2. Set up before solving.

Write the equation, expression, graph feature, or formula you plan to use.

### 3. Show the algebra.

Keep signs, restrictions, substitutions, and simplification visible.

### 4. Check reasonableness.

Substitute, estimate, inspect the graph, or compare units.

### 5. Answer the question asked.

Re-read the final sentence before marking your answer.

## After the test

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### Score

Mark each question and write down the test score.

### Sort

Group missed questions by topic, not by page number.

### Study

Review the explanation, then retry a similar problem.

## Common traps

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**Inequalities:** flip the sign when multiplying or dividing by a negative.

**Quadratics:** use  $2a$  in the denominator of the quadratic formula and interpret the discriminant before solving.

**Rational expressions:** excluded values come from the original denominator, even after simplifying.

**Radicals and logs:** check domain restrictions and extraneous solutions.

**Graphs:** scale the axes first, then label intercepts, asymptotes, extrema, or end behavior.



# What You'll Need



Gather materials before you begin

## Materials checklist

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- |   |                                 |   |                                     |
|---|---------------------------------|---|-------------------------------------|
| ✓ | Sharpened pencils               | ✓ | Good eraser                         |
| ✓ | Scratch paper                   | ✓ | Ruler or straightedge               |
| ✓ | Graphing calculator, if allowed | ✓ | Quiet place to work                 |
| ✓ | Timer for practice tests        | ✓ | The answer key for review afterward |

## Usually allowed

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Pencils, scratch paper provided on test day, graphing calculator when your state allows it, and a straight-edge for graphing.

## Usually not allowed

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Phones, notes, textbooks, online help, or any calculator/app not permitted by your official test rules.



**Same setup**



**Same tools**



**Better comparison**

A consistent routine makes your scores easier to compare.



# Algebra 2 Reference Sheet



High-yield formulas for quick review before each practice test

## Functions

Domain = allowed inputs; range = outputs.

$$\text{Average rate: } \frac{f(b) - f(a)}{b - a}$$

$f(x) + k$ : up/down;  $f(x - h)$ : right/left

$af(x)$ : vertical stretch/reflection

$f(bx)$ : horizontal change

Inverse:  $f^{-1}(f(x)) = x$

## Linear

$$\text{Slope: } m = \frac{y_2 - y_1}{x_2 - x_1}$$

Point-slope:  $y - y_1 = m(x - x_1)$

Slope-intercept:  $y = mx + b$

Standard:  $Ax + By = C$

Parallel: same  $m$ ; perpendicular:  $m_1 m_2 = -1$

## Systems

Solutions are intersections.

Substitution: solve one equation, plug in.

Elimination: align terms, add/subtract.

No solution: parallel lines.

Infinitely many: same line.

## Quadratics

Standard:  $y = ax^2 + bx + c$

Vertex:  $y = a(x - h)^2 + k$

Factored:  $y = a(x - r_1)(x - r_2)$

Axis:  $x = -\frac{b}{2a}$

$$\text{Formula: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant:  $b^2 - 4ac$

Roots:  $r_1 + r_2 = -\frac{b}{a}$ ,  $r_1 r_2 = \frac{c}{a}$

## Polynomials

Remainder: divide by  $x - a$ , remainder  $f(a)$ .

Factor:  $x - a$  factor iff  $f(a) = 0$ .

Zeros and factors:  $x = r \leftrightarrow (x - r)$

Even degree: same end behavior.

Odd degree: opposite end behavior.

Even multiplicity touches; odd crosses.

## Complex Numbers

$$i^2 = -1, i^3 = -i, i^4 = 1$$

$(a + bi) + (c + di) = (a + c) + (b + d)i$

$(a + bi)(c + di) = (ac - bd) + (ad + bc)i$

Conjugates:  $a + bi$ ,  $a - bi$

Real polynomials have conjugate complex roots.

## Rational

Excluded values come from original denominator.

Factor first; cancel common factors.

Vertical asymptotes: uncanceled denominator zeros.

Holes: canceled denominator zeros.

Horizontal asymptote compares degrees.

Rational inequality: use sign chart.

## Radicals

$$a^{m/n} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$$

$a^m a^n = a^{m+n}$

$$\frac{a^m}{a^n} = a^{m-n}$$

Power function:  $f(x) = ax^p$

Radical equations: isolate, power, check.

Even roots need nonnegative radicands.

## Exponential

Model:  $y = ab^x$

Growth:  $b > 1$ ; decay:  $0 < b < 1$

Compound:  $A = P(1 + \frac{r}{n})^{nt}$

Continuous:  $A = Pe^{rt}$

Half-life/decay:  $A = A_0(1 - r)^t$

## Logarithms

$$\log_b(x) = y \leftrightarrow b^y = x$$

$\log_b(MN) = \log_b M + \log_b N$

$\log_b(M/N) = \log_b M - \log_b N$

$\log_b(M^p) = p \log_b M$

Change base:  $\log_b x = \frac{\log x}{\log b}$

Log domain: argument  $> 0$ .

## Sequences

Arithmetic:  $a_n = a_1 + (n - 1)d$

Arithmetic recursive:  $a_n = a_{n-1} + d$

$$\text{Arithmetic sum: } S_n = \frac{n(a_1 + a_n)}{2}$$

Geometric:  $a_n = a_1 r^{n-1}$

Geometric recursive:  $a_n = r a_{n-1}$

$$\text{Finite sum: } S_n = \frac{a_1(1 - r^n)}{1 - r}$$

Infinite sum:  $S = \frac{a_1}{1 - r}$ ,  $|r| < 1$

## Matrices

Matrix size: rows  $\times$  columns.

Add/subtract only same dimensions.

Multiply  $A_{m \times n} B_{n \times p} = C_{m \times p}$ .

Identity:  $AI = IA = A$

For  $2 \times 2$ , determinant  $ad - bc$ .



# Algebra 2 Reference Sheet



Trig, conics, data, probability, and modeling reminders

## Trigonometry

Unit point:  $(\cos \theta, \sin \theta)$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$\sin = \frac{\text{opp}}{\text{hyp}}, \cos = \frac{\text{adj}}{\text{hyp}}, \tan = \frac{\text{opp}}{\text{adj}}$$

$$\text{Sine/cosine period: } \frac{2\pi}{|b|}$$

$$\text{Tangent period: } \frac{\pi}{|b|}$$

$$\text{Law of Sines: } \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\text{Law of Cosines: } c^2 = a^2 + b^2 - 2ab \cos C$$

## Trig Graphs

$$y = A \sin(B(x - C)) + D$$

Amplitude:  $|A|$

$$\text{Period: } \frac{2\pi}{|B|} \text{ for sine/cosine}$$

$$\text{Period: } \frac{\pi}{|B|} \text{ for tangent}$$

Phase shift:  $C$

Midline:  $y = D$

Max/min:  $D \pm |A|$

## Special Angles

$$30^\circ = \frac{\pi}{6}, 45^\circ = \frac{\pi}{4}, 60^\circ = \frac{\pi}{3}$$

$$\sin 30^\circ = \frac{1}{2}, \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\sin 45^\circ = \cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$\sin 60^\circ = \frac{\sqrt{3}}{2}, \cos 60^\circ = \frac{1}{2}$$

Quadrant signs: ASTC.

## Conics

$$\text{Circle: } (x - h)^2 + (y - k)^2 = r^2$$

$$\text{Parabola: } (x - h)^2 = 4p(y - k)$$

$$\text{or } (y - k)^2 = 4p(x - h)$$

$$\text{Ellipse: } \frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$$

$$\text{Hyperbola: } \frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$$

## Conic Details

Circle center  $(h, k)$ , radius  $r$ .

Parabola vertex  $(h, k)$ , focus is  $|p|$  away.

Ellipse: larger denominator gives major axis.

$$\text{Ellipse: } c^2 = a^2 - b^2$$

$$\text{Hyperbola: } c^2 = a^2 + b^2$$

Asymptotes guide hyperbola branches.

## Statistics

$$\text{Mean: } \bar{x} = \frac{\sum x}{n}$$

$$z = \frac{x - \mu}{\sigma}$$

Residual = actual - predicted

Correlation  $r$  is between  $-1$  and  $1$ .

Normal: about 68%, 95%, 99.7% within 1, 2, 3 SDs.

## Data Displays

$$\text{IQR: } Q_3 - Q_1$$

$$\text{Outlier fence: } Q_1 - 1.5(\text{IQR}), Q_3 + 1.5(\text{IQR})$$

Median resists outliers.

Mean is pulled by outliers.

Standard deviation measures typical distance from mean.

## Regression

Residual: actual - predicted.

Positive  $r$ : as  $x$  rises,  $y$  tends to rise.

Negative  $r$ : as  $x$  rises,  $y$  tends to fall.

Strong linear fit:  $|r|$  close to 1.

$R^2$  is percent of variation explained.

## Probability

$$P(A | B) = \frac{P(A \cap B)}{P(B)}$$

Independent:  $P(A \cap B) = P(A)P(B)$

Either/or:  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$$\text{Permutations: } {}_n P_r = \frac{n!}{(n - r)!}$$

$$\text{Combinations: } {}_n C_r = \frac{n!}{r!(n - r)!}$$

$$\text{Binomial: } {}_n C_r p^r (1 - p)^{n - r}$$

## Counting

Fundamental counting principle: multiply choices.

Permutation: order matters.

Combination: order does not matter.

With replacement: choices stay the same.

Without replacement: choices decrease.

## Finance

Simple interest:  $I = Prt$

Future amount:  $A = P + I$

$$\text{Compound: } A = P(1 + \frac{r}{n})^{nt}$$

$$\text{Continuous: } A = Pe^{rt}$$

$$\text{Depreciation: } A = P(1 - r)^t$$

$$\text{Percent change: } \frac{\text{new} - \text{old}}{\text{old}}$$

## Modeling Checks

Linear: constant first differences.

Quadratic: constant second differences.

Exponential: constant ratios.

Domain should match the context.

Round only at the end unless directed.

# My Test Tracker

Record scores, review topics, and save your progress online

Name: \_\_\_\_\_

Start Date: \_\_\_\_\_

Test	Date	Score / 50	Percent	Topic or chapter to review
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____
10	_____	_____	_____	_____

## Review pattern

### Tests 1–3

Build the baseline and identify weak chapters.

### Tests 4–7

Improve pacing and accuracy topic by topic.

### Tests 8–10

Rehearse under full test-day conditions.

Track your progress and save your scores on [ViewMath.com](https://www.viewmath.com)

Scan the QR code to enter scores, save progress, and review weak topics.

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PRACTICE TEST

1

## Practice Test 1

 10 Questions

### Before You Start

- ✓ *Read each question carefully before choosing your answer.*
- ✓ *Show your work on scratch paper when you need to.*
- ✓ *Skip hard questions and come back to them later.*
- ✓ *Check your answers when you're done.*
- ✓ *Take your time — there's no rush!*

★ *You've Got This!* ★

*Do your best and show what you know!*



1. A company sells adult tickets for 12 and student tickets for 8. Which equation models 20 tickets totaling 216 if  $a$  is adult and  $s$  is student?

(A)  $a + s = 216$

(B)  $12a + 8s = 20$

(C)  $a + s = 20$  and  $12a + 8s = 216$

(D)  $8a + 12s = 216$  only

2. Which equation is equivalent to  $9x + 6 = 33$ ?

(A)  $9x = 27$

(B)  $9x = 39$

(C)  $x + 6 = 33$

(D)  $15x = 33$

3. Use the table to evaluate the expression  $2x^2 - 3x$  at the listed input.

$x$	$2x^2 - 3x$
-1	?
0	0
2	2

(A) -5

(B) 2

(C) 5

(D) -1

4. Solve  $-2(x + 4) = 10$ .

(A)  $x = -9$

(B)  $x = -1$

(C)  $x = 1$

(D)  $x = 9$



5. What is the slope of the line through  $(2, 5)$  and  $(6, 13)$ ?

(A) 2

(B)  $\frac{1}{2}$

(C) 4

(D) 8

6. What is the  $x$ -intercept of  $2x + 5y = 20$ ?

(A) 4

(B) 10

(C) 20

(D)  $-4$

7. Which system has infinitely many solutions?

(A)  $y = 2x + 1$  and  $y = 2x - 3$

(B)  $y = 2x + 1$  and  $4x - 2y = -2$

(C)  $y = x$  and  $y = -x$

(D)  $x + y = 4$  and  $x - y = 2$

8. Which set is ordered from smallest to largest?

(A)  $\{-\sqrt{9}, -2, 0, \sqrt{2}\}$

(B)  $\{-2, -\sqrt{9}, 0, \sqrt{2}\}$

(C)  $\{0, -2, -\sqrt{9}, \sqrt{2}\}$

(D)  $\{-\sqrt{9}, \sqrt{2}, -2, 0\}$

9. What is the domain of  $g(x) = \frac{4}{x-7}$ ?

(A) all real numbers

(B)  $x \neq 7$

(C)  $x \geq 7$

(D)  $x \leq 7$



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10. Use the area diagram to choose the factored form.

	$x$	$4$
$x$	$x^2$	$4x$
$3$	$3x$	$12$

(A)  $(x + 3)(x + 4)$

(B)  $(x - 3)(x - 4)$

(C)  $(x + 1)(x + 12)$

(D)  $(x + 7)(x + 12)$



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# *Answer Key & Explanations*



## Answer Key

First try each test on your own, then check your work here.

### Practice Test 1 – Answer Key

- 1 C   2 A   3 C   4 A   5 A   6 B   7 B   8 A   9 B
- 10 A

### Time to Learn!

Review the explanations below, *especially for the questions you missed.*

Understanding why each answer is correct builds stronger problem-solving skills.

*Tip:* Circle any questions you got wrong, then read their explanation carefully.

### Practice Test 1 – Detailed Explanations

- 1 The count equation is  $a + s = 20$  and the revenue equation is  $12a + 8s = 216$ .
- 2 Subtracting 6 from both sides preserves the solution set and gives  $9x = 27$ .
- 3 At  $x = -1$ ,  $2(-1)^2 - 3(-1) = 2 + 3 = 5$ , so the missing table value is 5.



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- 4 Divide by  $-2$  to get  $x + 4 = -5$ , then subtract 4 to get  $x = -9$ .
- 5 Slope is change in  $y$  over change in  $x$ :  $\frac{13-5}{6-2} = \frac{8}{4} = 2$ .
- 6 Set  $y = 0$  to find the  $x$ -intercept:  $2x = 20$ , so  $x = 10$ .
- 7 The second equation rewrites as  $y = 2x + 1$ , so both equations describe the same line.
- 8 Since  $-\sqrt{9} = -3$ , the order is  $-3, -2, 0, \sqrt{2}$ .
- 9 The denominator cannot equal zero, so  $x - 7 \neq 0$  and  $x \neq 7$ .
- 10 The side lengths shown are  $x + 4$  and  $x + 3$ , so the product is  $(x + 3)(x + 4)$ .



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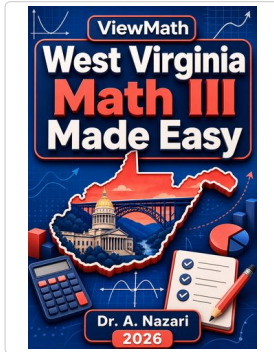
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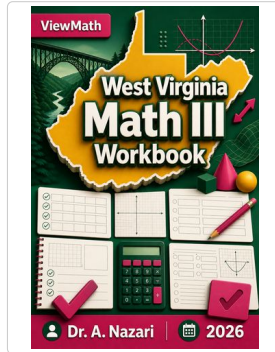
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Study Guide



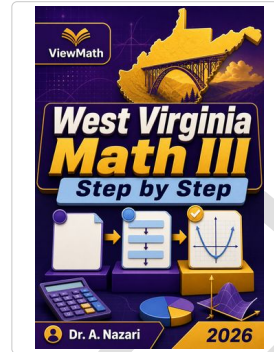
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Workbook



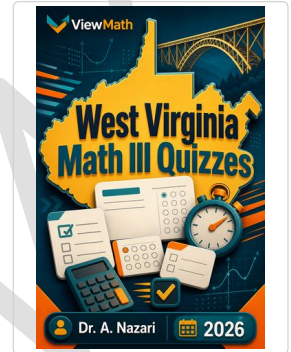
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Step-by-Step



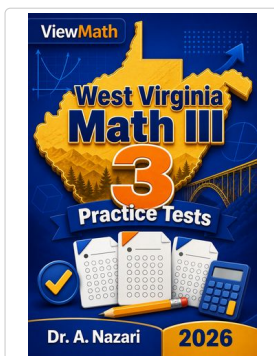
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Quizzes



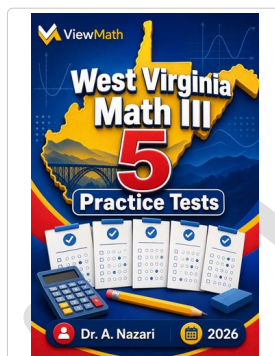
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3 Practice Tests



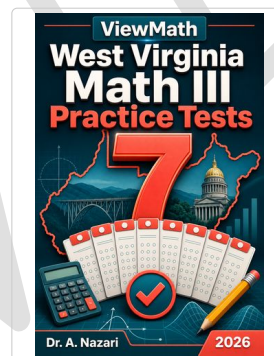
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5 Practice Tests



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7 Practice Tests



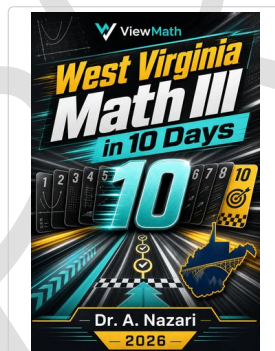
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Math in 30 Days



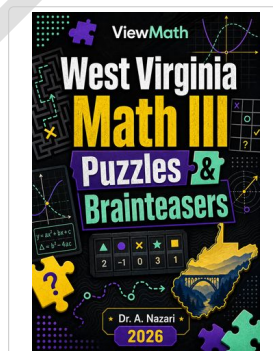
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Math in 10 Days



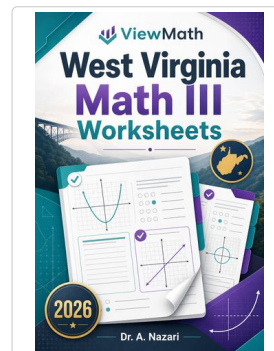
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