

# 3 Virginia SOL Grade 9 Math Practice Tests

*Full-Length Test Prep with Detailed Answer Explanations*

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# 3 Practice Tests

★ Algebra 1 ★

## Welcome!

This book contains **3 full-length Algebra 1 practice tests** designed to prepare you for your end-of-course assessment. Each test covers all nine major topics:

📖 Foundations of Algebra    📖 Linear Equations

📖 Functions    📖 Linear Functions & Graphs

📖 Systems of Equations    📖 Polynomials & Factoring

📖 Quadratic Functions    📖 Exponential Functions

📖 Data Analysis & Statistics

Every test includes **detailed answer explanations** so you can learn from each question.

*Practice builds confidence. Confidence builds results.*

“ Take your time, review each answer explanation, and learn from every mistake. That's how you grow! ”



# How to Use This Book

Your 3-step path to Algebra 1 success

## What's Inside


- **3 Full-Length Practice Tests** — each covers all 9 chapters of Algebra 1: real numbers, linear equations & inequalities, functions, graphing, systems of equations, polynomials, quadratics, exponential functions, and data analysis.
- **Detailed Answer Explanations** — every question includes a complete step-by-step solution to help you learn from your mistakes.
- **Formula Reference Sheet** — all the key Algebra 1 formulas and concepts organized in one page for quick access.
- **Test Tracker** — record scores and track improvement across all three tests.


## Suggested Study Schedule

1. **Test 1 (Untimed — Diagnostic):** Take the first test without a time limit. This is your baseline. Don't worry about speed—focus on showing your work and trying every question.
2. **Study the gaps:** After scoring Test 1, identify your weakest topics. Spend 5–7 days reviewing those areas before moving to Test 2.
3. **Test 2 (Timed — 120 Minutes):** Take this test with a timer. Practice pacing yourself. Review your answers and compare to Test 1 to see improvement.
4. **Test 3 (Full Test Conditions):** Simulate real test conditions—quiet room, no notes, timed. This is your dress rehearsal.

 **Types of Questions**

• **Multiple Choice:** Four answer options. Work the problem yourself first, then match your answer. Eliminate clearly wrong options to narrow your choices.

 **Short Answer & Constructed Response:** Write your full solution. Show all equations, substitutions, and simplification steps. Partial credit is given for correct work even if the final answer is missing or wrong.

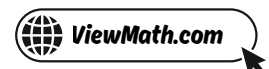
 **Graphing & Data:** Plot points, draw lines, and interpret graphs and scatter plots. Label axes clearly and use a ruler for straight lines.



**Tip:** After each test, go back and review every question you missed. Read the full explanation and try the problem again on your own. That single habit makes the biggest difference.



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# 💡 Test-Taking Tips 💡

Five key strategies for Algebra 1 success

## Five Strategies for Every Problem

- 1. Read carefully.** Don't skim. Read every word of the problem and identify exactly what is being asked before you start calculating.
- 2. Set up before solving.** Write the equation or expression before diving into arithmetic. Label your variables and identify what you're solving for.
- 3. Show your work.** Write each step clearly—distribute, combine like terms, isolate the variable. This earns partial credit and reduces mistakes.
- 4. Check your answer.** Plug your result back into the original equation or condition. Does it work?
- 5. Re-read the question.** Make sure you answered what was actually asked. Many mistakes come from solving correctly but answering the wrong question.

## Common Algebra 1 Mistakes to Watch For

- ⚠️ Sign errors:** When multiplying or dividing an inequality by a negative, flip the sign.
- ⚠️ Distributing negatives:**  $-(3x - 5) = -3x + 5$ , not  $-3x - 5$ .
- ⚠️ Slope:** Rise over run,  $m = \frac{y_2 - y_1}{x_2 - x_1}$ . Don't swap  $x$  and  $y$ .
- ⚠️ Factoring:** Always check by multiplying your factors back out.
- ⚠️ Quadratic formula:** Don't forget the "2a" in the denominator, not just "a".

 Don't Forget

- Circle keywords in word problems: “how many more,” “total,” “rate”
- For word problems, define your variable first: “Let  $x = \dots$ ”
- When graphing, plot at least two points and check a third
- Convert between forms when it helps: slope-intercept  $\leftrightarrow$  standard
- For systems, check your solution in both equations



“ The best way to learn algebra is to understand **why** each step works, not just memorize procedures. When you review your mistakes, ask: Where did my thinking go wrong? ”



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# What You'll Need

Gather these materials before you begin

## Materials Checklist

- ✓ **Sharpened Pencils** — #2 pencils, at least two
- ✓ **Good Eraser** — for clean corrections
- ✓ **Scratch Paper** — for working out problems
- ✓ **Graphing Calculator** — if allowed by your state's test
- ✓ **Ruler / Straightedge** — for graphing
- ✓ **Quiet Space** — no distractions
- ✓ **Focused Mind** — ready to do your best

## Typically Allowed

- ✓ Pencils and eraser
- ✓ Scratch paper (provided on official test day)
- ✓ Graphing calculator (varies by state—check your test rules)
- ✓ Ruler or straightedge

## Not Allowed

- ✗ Cell phone or any electronic device (other than allowed calculator)
- ✗ Notes, textbooks, or reference sheets (beyond what's provided)
- ✗ Help from others during the test

 **A Note for Parents & Guardians**

Three tests provide a focused, manageable study plan. Space them **one week apart** with study days in between.

**How to help:**

- Test 1 should be untimed — focus on learning, not speed.
- After each test, review the full solutions together. Ask: “Which topics were hardest? Let’s study those before the next one.”
- Use the Test Tracker page to visualize progress over time.
- For extra support on specific topics, pair this book with our **Algebra 1 Study Guide**.

PREVIEW



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# Algebra 1 Reference Sheet

Key formulas and facts you may use during each practice test

## ★ Properties & Exponents

Commutative:  $a + b = b + a$ ;  $ab = ba$

Associative:  $(a + b) + c = a + (b + c)$

Distributive:  $a(b + c) = ab + ac$

$a^m \cdot a^n = a^{m+n}$        $(a^m)^n = a^{mn}$

$\frac{a^m}{a^n} = a^{m-n}$        $a^0 = 1$

$a^{-n} = \frac{1}{a^n}$        $(ab)^n = a^n b^n$

## ★ Linear Equations & Inequalities

Slope-intercept:  $y = mx + b$

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

Standard form:  $Ax + By = C$

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

Parallel lines: same slope

Perpendicular:  $m_1 \cdot m_2 = -1$

## ★ Functions

A function maps each input to exactly one output.

Vertical line test: passes through at most one point.

Domain: set of all inputs ( $x$ -values)

Range: set of all outputs ( $y$ -values)

$f(x)$  notation:  $f(3)$  means substitute  $x = 3$

## ★ Systems of Equations

Solve by graphing, substitution, or elimination

One solution: lines intersect (consistent)

No solution: lines are parallel

Infinitely many: same line (dependent)

## ★ Polynomials & Factoring

$(a + b)^2 = a^2 + 2ab + b^2$

$(a - b)^2 = a^2 - 2ab + b^2$

$a^2 - b^2 = (a + b)(a - b)$

To factor  $ax^2 + bx + c$ : find two numbers that multiply to  $ac$  and add to  $b$

## ★ Quadratic Functions

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

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

Vertex:  $(h, k)$ ; axis of symmetry:  $x = h$

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

Discriminant:  $b^2 - 4ac$

$> 0$ : two real solutions     $= 0$ : one     $< 0$ : none

## ★ Exponential Functions & Sequences

Growth:  $y = a \cdot b^x$  where  $b > 1$

Decay:  $y = a \cdot b^x$  where  $0 < b < 1$

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

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

## ★ Data & Statistics

Line of best fit: approximates scatter plot trend

Correlation: positive, negative, or none

Correlation  $\neq$  causation

Residual = actual - predicted

Good fit: residuals small, randomly scattered

## ★ Square Roots & Radicals

Perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$        $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

Simplify:  $\sqrt{50} = \sqrt{25 \cdot 2} = 5\sqrt{2}$

# My Test Tracker

Record your scores and track your progress

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

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

## Test 1 (Untimed – Diagnostic)

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

Score: \_\_\_\_\_ / \_\_\_\_\_

Percent: \_\_\_\_\_

Topics to review: \_\_\_\_\_

## Test 2 (Timed – 120 Minutes)

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

Score: \_\_\_\_\_ / \_\_\_\_\_

Percent: \_\_\_\_\_

Improved on: \_\_\_\_\_

Still need work: \_\_\_\_\_

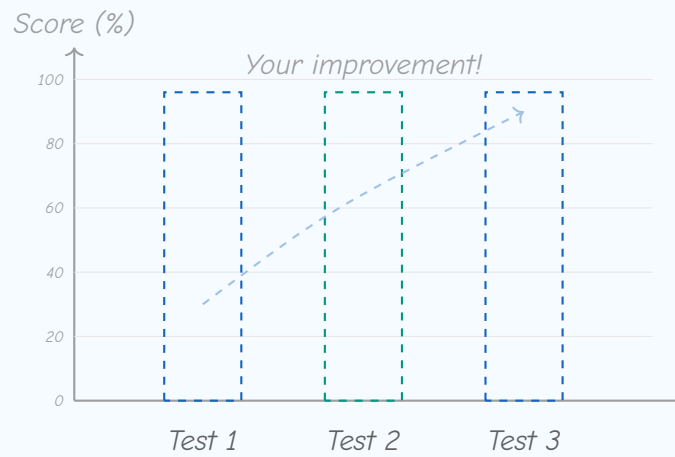
## Test 3 (Timed – Full Test Conditions)

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

Score: \_\_\_\_\_ / \_\_\_\_\_

Percent: \_\_\_\_\_

Total improvement since Test 1: \_\_\_\_\_

 Score Progress


Shade each bar to your score after each test.

 Final Reflection

The most important thing I learned: \_\_\_\_\_

The topic where I improved the most: \_\_\_\_\_

What I want to keep working on: \_\_\_\_\_



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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. The table below shows the monthly cost (in dollars) of two streaming plans. Plan A has a \$40 signup fee and costs \$25 per month. Plan B has an \$80 signup fee and costs \$15 per month. After how many months will both plans have the same total cost?

Month	Plan A	Plan B
1	\$65	\$95
2	\$90	\$110
3	\$115	\$125
4	?	?
5	?	?

Your Answer:

2. Simplify  $(3x^2)(5x^4)$ .

(A)  $8x^6$

(B)  $15x^6$

(C)  $15x^8$

(D)  $8x^8$

3. What is the quotient of  $(2x^2 + x - 6) \div (2x - 3)$ ?

(A)  $x + 2$

(B)  $x - 2$

(C)  $x + 3$

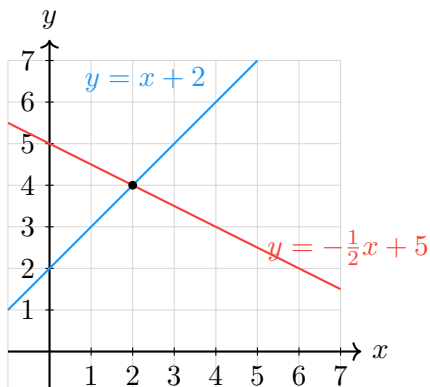
(D)  $2x + 2$



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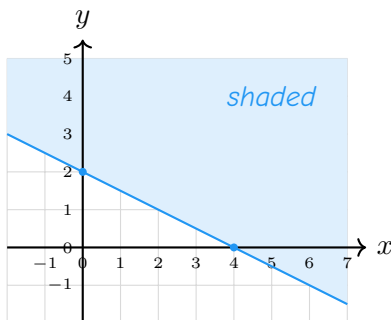


4. Two lines are graphed on the coordinate plane below. Classify the system as consistent and independent, consistent and dependent, or inconsistent.



Your Answer:

5. Which inequality matches the graph below?



The solid boundary line passes through  $(0, 2)$  and  $(4, 0)$ . The region above the line is shaded.

(A)  $y < -\frac{1}{2}x + 2$

(B)  $y > -\frac{1}{2}x + 2$

(C)  $y \leq -\frac{1}{2}x + 2$

(D)  $y \geq -\frac{1}{2}x + 2$



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6. Which table below does NOT represent a function?

Table I

$x$	1	2	3
$y$	5	5	5

Table II

$x$	1	1	2
$y$	3	7	5

- (A) Table I only                      (B) Table II only
- (C) Both Table I and Table II      (D) Neither table

7. In a survey of 200 students, 80 prefer pizza and 120 prefer tacos. Of the pizza lovers, 50 are girls. What is the conditional relative frequency of being a girl, given that a student prefers pizza? Express your answer as a percent.

Your Answer:

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8. Simplify  $\sqrt{12} \cdot \sqrt{3}$ .

Your Answer:

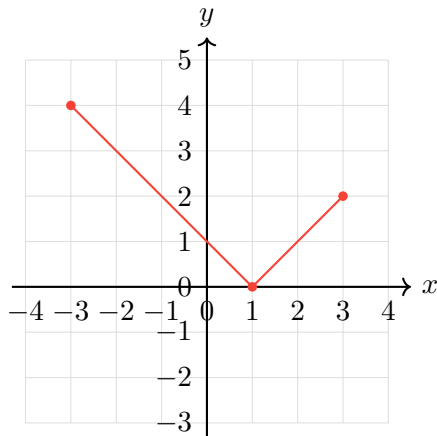
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9. The graph shows function  $g$ . For which input does  $g(x) = 0$ ?



(A)  $x = -3$

(B)  $x = 0$

(C)  $x = 1$

(D)  $x = 3$

10. A student claims that  $x^2 - 6x + 10 = 0$  has two real solutions because the coefficient of  $x^2$  is positive. Which statement best explains the error?

(A) The student confused the leading coefficient with the discriminant.

(B) The student forgot to factor the equation first.

(C) The student divided by zero.

(D) The student should have used completing the square instead.



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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 4

2 B

3 A

4 Consistent and independent

5 D

6 B

7 62.5%

8 6

9 C

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 Plan A costs  $40 + 25m$  and Plan B costs  $80 + 15m$ . Set them equal:  $40 + 25m = 80 + 15m$ . Subtract  $15m$  and  $40$ :  $10m = 40$ , so  $m = 4$  months.

2 Multiply the coefficients:  $3 \times 5 = 15$ . Use the product rule to add the exponents:  $x^2 \cdot x^4 = x^{2+4} = x^6$ . The result is  $15x^6$ . Choice C incorrectly multiplies the exponents instead of adding.



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3 Use polynomial long division:  $2x^2 \div 2x = x$ , and  $x(2x - 3) = 2x^2 - 3x$ . Subtract to get  $4x - 6$ . Then  $4x \div 2x = 2$ , and  $2(2x - 3) = 4x - 6$ . The remainder is 0, so the quotient is  $x + 2$ .

4 The two lines have different slopes (1 and  $-\frac{1}{2}$ ) and intersect at exactly one point, (2, 4). A system with one solution is consistent and independent.

5 The slope is  $m = \frac{0-2}{4-0} = -\frac{1}{2}$  and the  $y$ -intercept is 2. A solid line means  $\leq$  or  $\geq$ , and shading above means  $y \geq$ . The inequality is  $y \geq -\frac{1}{2}x + 2$ .

6 In Table II the input  $x = 1$  maps to both 3 and 7. One input with two different outputs means it is not a function. Table I is a function because each input (1, 2, 3) maps to one output (5).

7 "Given prefers pizza" means the denominator is 80. The conditional relative frequency is  $\frac{50}{80} = 0.625 = 62.5\%$ .

8 Use the product property of radicals:  $\sqrt{12} \cdot \sqrt{3} = \sqrt{12 \times 3} = \sqrt{36} = 6$ .

9 The graph crosses the  $x$ -axis at the point (1, 0). Since  $g(1) = 0$ , the output is zero when  $x = 1$ .

10 The number of real solutions depends on the discriminant, not the leading coefficient. Here  $D = 36 - 40 = -4 < 0$ , so there are no real solutions. The sign of  $a$  determines whether the parabola opens up or down, not whether it crosses the  $x$ -axis.



**Well done checking your answers!**

Keep practicing to strengthen your skills.

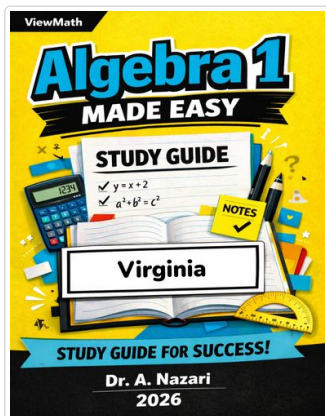


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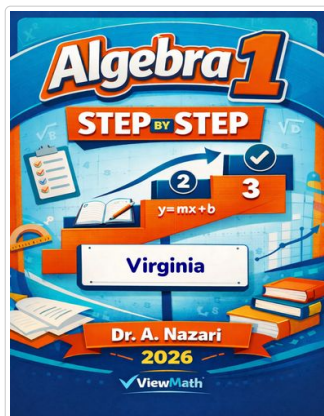
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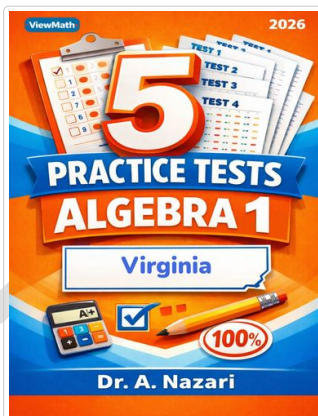
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Step-by-Step



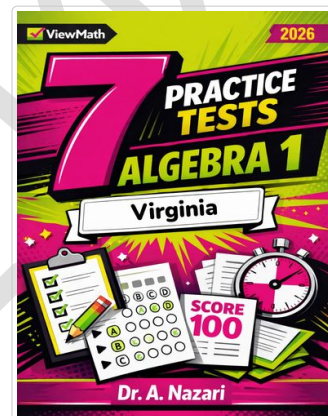
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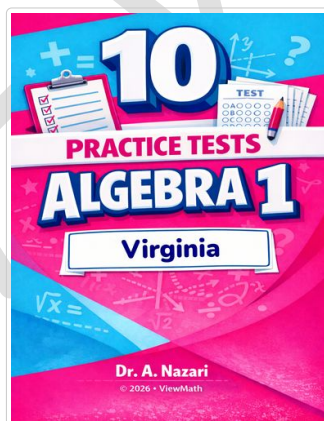
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7 Practice Tests



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10 Practice Tests



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