

# 5 Full-Length Virginia SOL Grade 9 Math Practice Tests

*Extra Practice for Test Day Success*

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# 5 Practice Tests

Algebra 1



## Welcome!

This book contains **5 full-length Algebra 1 practice tests** to prepare you for your end-of-course assessment. Each test covers every major topic you need to know:

Foundations of Algebra    Linear Equations

Functions    Linear Functions & Graphs

Systems of Equations    Polynomials & Factoring

Quadratic Functions    Exponential Functions

Data Analysis & Statistics

With five tests, you'll have plenty of opportunity to identify weak areas, practice them, and build real confidence.

*The more you practice, the more prepared you'll be.*

“Five tests give you a real advantage. Use each one to get stronger before the real thing!”



# How to Use This Book

A 5-week plan for effective test preparation

## What's Inside

- **5 Full-Length Practice Tests** — each covers all 9 chapters of Algebra 1: real numbers & exponents, linear equations & inequalities, functions, linear functions & graphing, systems of equations, polynomials & factoring, 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 five tests.

## Your 5-Week Study Path



Space tests one week apart. Use the days between to study the topics you missed.

## 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: Five tests is enough to see real progress. Space them out, study between them, and always review the full explanation for every problem you get wrong.*

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# 💡 Test-Taking Tips 💡

Five key strategies for 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. Estimate first.** Before solving, make a rough estimate. This helps you catch major errors in your final answer.
- 3. Show your work.** Write the equation, substitute values, and simplify step by step. This earns partial credit and reduces mistakes.
- 4. Check your answer.** Plug your result back into the original equation or condition. Does it satisfy the equation?
- 5. Manage your time.** If you're stuck for more than 2 minutes, skip the problem and come back later. Don't let one question eat your time.

## ⚠️ Common Mistakes to Watch For

- ⚠️ **Sign errors:** When solving  $3x - 7 = 14$ , add 7 to both sides. Watch negative signs.
- ⚠️ **Distributing negatives:**  $-(2x - 5) = -2x + 5$ , not  $-2x - 5$ .
- ⚠️ **Slope formula:**  $m = \frac{y_2 - y_1}{x_2 - x_1}$  — keep the order consistent.
- ⚠️ **Factoring:** Always check your factored form by multiplying it back out.
- ⚠️ **Quadratic formula:** Don't forget the  $\pm$  — most quadratics have two solutions.

 **Don't Forget**

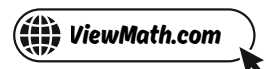
- Circle keywords in the problem: “solve,” “simplify,” “which equation,” “graph”
- For word problems, define a variable first, then translate step by step
- When graphing lines, plot at least two points and use a ruler
- For systems of equations, check your solution in both equations
- For inequalities, remember to flip the sign when multiplying or dividing by a negative



“ After each practice test, go back to every problem you got wrong and figure out *where* your approach broke down. That single habit makes the biggest difference. ”



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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 test
- ✓ **Ruler / Straightedge** — for graphing lines
- ✓ **Quiet Space** — no distractions
- ✓ **Focused Mind** — ready to do your best

## Allowed Materials

- ✓ Pencils and eraser
- ✓ Scratch paper (provided on official test day)
- ✓ Graphing calculator (most Algebra 1 state tests allow calculators — check your state's policy)
- ✓ Ruler or straightedge

## Not Allowed

- ✗ Cell phone or any electronic device
- ✗ Notes, textbooks, or reference sheets (unless provided by the test)
- ✗ Help from others during the test
- ✗ Calculator apps or internet access

### ♥ A Note for Parents & Guardians

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

#### How to help:

- Tests 1–2 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**.

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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)

Date: \_\_\_\_\_ Score: \_\_\_\_\_ / \_\_\_\_\_ Percent: \_\_\_\_\_ Topics to review:  
\_\_\_\_\_

## Test 2 (Untimed or Soft Timer)

Date: \_\_\_\_\_ Score: \_\_\_\_\_ / \_\_\_\_\_ Percent: \_\_\_\_\_ Improved on:  
\_\_\_\_\_

## Test 3 (Timed — 120 Minutes)

Date: \_\_\_\_\_ Score: \_\_\_\_\_ / \_\_\_\_\_ Percent: \_\_\_\_\_ Still challenging:  
\_\_\_\_\_

## Test 4 (Timed)

Date: \_\_\_\_\_ Score: \_\_\_\_\_ / \_\_\_\_\_ Percent: \_\_\_\_\_ Growth from Test 1:  
\_\_\_\_\_

## Test 5 (Full Test Conditions)

Date: \_\_\_\_\_ Score: \_\_\_\_\_ / \_\_\_\_\_ Percent: \_\_\_\_\_ Total improvement:  
\_\_\_\_\_

### 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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## For Parents, Teachers & Students

Great job on the practice tests! Want to keep improving? ViewMath Academy is your **free online companion** to this book.

-  **Score Analyzer** — Enter your answers and instantly see which topics need more practice
-  **Interactive Lessons** — Review the concepts behind each question with clear explanations
-  **Adaptive Quizzes** — Practice your weak topics with questions that match your level
-  **Progress Tracking** — See your mastery grow across all Grade A1 math topics
-  **Personalized Dashboard** — A learning plan tailored just for you



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PRACTICE TEST

1

## Practice Test 1

 10 Questions

### Before You Start

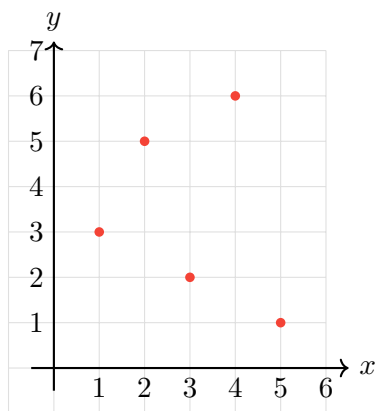
- ✓ *Read each question carefully before choosing your answer.*
- ✓ *Show your work on scratch paper when you need to.*
- ✓ *Skip hard questions and come back to them later.*
- ✓ *Check your answers when you're done.*
- ✓ *Take your time — there's no rush!*

★ *You've Got This!* ★

*Do your best and show what you know!*



1. Look at the graph below. Is this relation a function? Write "Yes" or "No."



Your Answer:

2. Which expression is equivalent to  $x^{-3}$ ?

(A)  $-x^3$

(B)  $-3x$

(C)  $\frac{1}{x^3}$

(D)  $\frac{x}{3}$



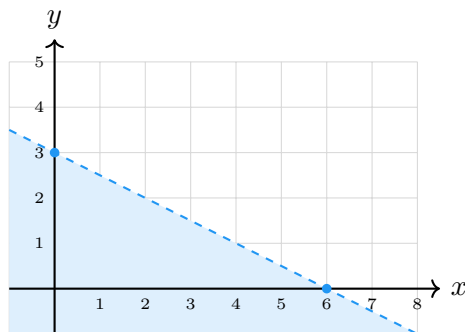
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3. The graph shows a linear inequality with a dashed boundary line passing through  $(0, 3)$  and  $(6, 0)$ , with the region below the line shaded.



Write the inequality shown.

Your Answer

4. What are the solutions of  $3x^2 - 2x - 5 = 0$ ?

(A)  $x = \frac{5}{3}$  and  $x = -1$

(B)  $x = -\frac{5}{3}$  and  $x = 1$

(C)  $x = 5$  and  $x = -\frac{1}{3}$

(D)  $x = -5$  and  $x = \frac{1}{3}$

5. In a two-way table of 160 adults, 48 drink coffee and exercise, 72 drink coffee total, and 100 exercise total. What is the conditional relative frequency of drinking coffee, given that the person exercises?

(A) 30%

(B) 45%

(C) 48%

(D) 66.7%

6. For what value of  $k$  does the system  $3x + y = 9$  and  $6x + 2y = k$  have infinitely many solutions?

(A) 9

(B) 12

(C) 15

(D) 18



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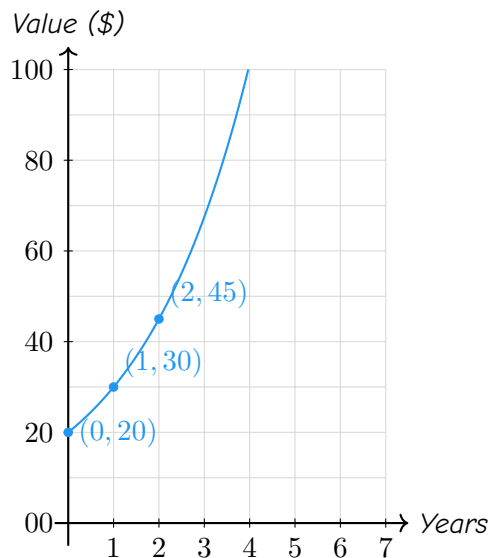


7. Solve  $8x - 3 = 5x + 12$ .

Your Answer:

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8. The graph below shows the value of a collectible card over time, modeled by an exponential growth function.



Based on the labeled points, what is the value of the card after 3 years? Round to the nearest cent.

Your Answer:

---

9. Simplify  $(a + b)^2 - 2ab$ .

Your Answer:

---



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10. Solve  $|x| = 7$ .

(A)  $x = 7$  only

(B)  $x = -7$  only

(C)  $x = 7$  or  $x = -7$

(D) No solution

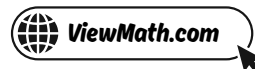
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# *Answer Key & Explanations*



## Answer Key

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

### Practice Test 1 – Answer Key

1 Yes

2 C

3  $y < -\frac{1}{2}x + 3$ 

4 A

5 C

6 D

7 5

8 \$67.50

9  $a^2 + b^2$ 

10 C

### 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 Apply the vertical line test: every vertical line passes through at most one point. Each  $x$ -value (1, 2, 3, 4, 5) corresponds to exactly one  $y$ -value, so the relation is a function.

2 The negative exponent rule states  $a^{-n} = \frac{1}{a^n}$ . So  $x^{-3} = \frac{1}{x^3}$ . A negative exponent means reciprocal, not a negative number. Choice A confuses the sign of the exponent with the sign of the base.



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3 The slope is  $m = \frac{0-3}{6-0} = -\frac{1}{2}$  and the  $y$ -intercept is 3. The dashed line means strict inequality, and shading below means  $<$ . The inequality is  $y < -\frac{1}{2}x + 3$ .

4 With  $a = 3$ ,  $b = -2$ ,  $c = -5$ , the discriminant is  $D = 4 + 60 = 64$ . Then  $x = \frac{2 \pm 8}{6}$ , giving  $x = \frac{10}{6} = \frac{5}{3}$  or  $x = \frac{-6}{6} = -1$ .

5 "Given exercises" means the denominator is the exercise column total, 100. The conditional relative frequency is  $\frac{48}{100} = 0.48 = 48\%$ .

6 Multiply the first equation by 2:  $6x + 2y = 18$ . For infinitely many solutions, this must be identical to the second equation. So  $k = 18$ .

7 Subtract  $5x$  from both sides:  $3x - 3 = 12$ . Add 3:  $3x = 15$ . Divide by 3:  $x = 5$ .

8 The initial value is  $a = 20$  and the growth factor is  $b = \frac{30}{20} = 1.5$ . After 3 years:  $f(3) = 20(1.5)^3 = 20 \times 3.375 = \$67.50$ .

9 Expand  $(a + b)^2 = a^2 + 2ab + b^2$ . Then subtract  $2ab$ :  $a^2 + 2ab + b^2 - 2ab = a^2 + b^2$ .

10 Absolute value measures distance from 0. If  $|x| = 7$ , then  $x$  is 7 units from 0, so  $x = 7$  or  $x = -7$ .



**Well done checking your answers!**

Keep practicing to strengthen your skills.

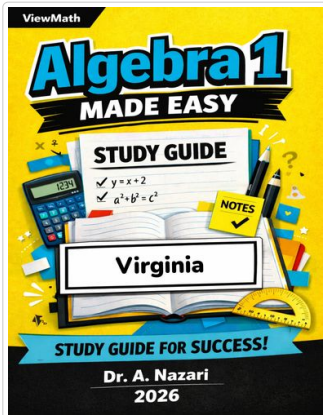


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**Great Job! Keep Learning with ViewMath!**

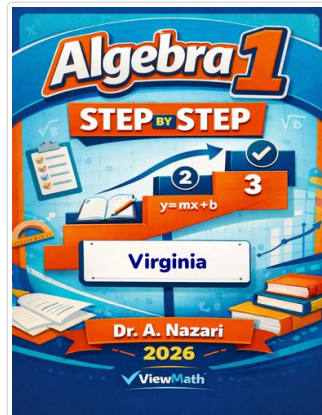
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Study Guide



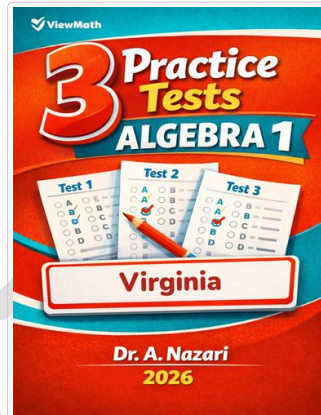
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Step-by-Step



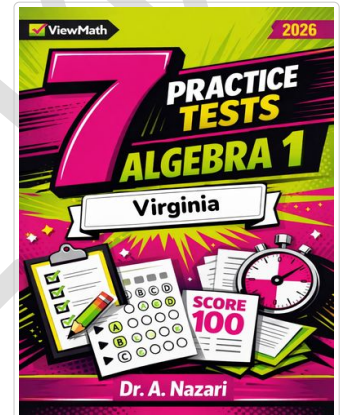
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3 Practice Tests



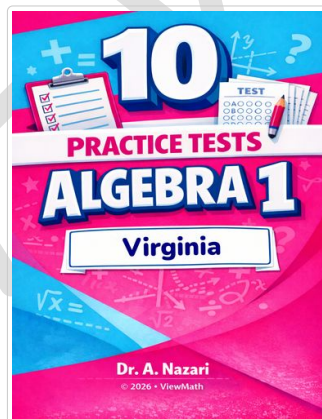
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7 Practice Tests



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10 Practice Tests



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