

7 Pennsylvania Keystone Grade 9 Math Practice Tests

Comprehensive Test Prep with Detailed Answers

Dr. A. Nazari

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7 Practice Tests

★ Algebra 1 ★

Welcome!

This book contains **7 full-length practice tests** designed to give you thorough preparation for your Algebra 1 assessment. Each test covers all nine major chapters:

- 📖 Foundations & Exponents
- 📖 Linear Equations & Inequalities
- 📖 Functions
- 📖 Linear Functions & Graphing
- 📖 Systems of Equations
- 📖 Polynomials & Factoring
- 📖 Quadratic Functions
- 📖 Exponential Functions
- 📖 Data & Statistics

Seven tests give you the repetition you need to master every topic. With each test, you'll get faster, more accurate, and more confident.

Repetition builds mastery. Mastery builds confidence.

“Seven tests means seven chances to improve. Focus on one chapter at a time and you'll see real results!”



How to Use This Book

Make the most of 7 practice tests

What's Inside

- **7 Full-Length Practice Tests** — each covers all 9 chapters of Algebra 1: foundations & exponents, linear equations & inequalities, functions, linear functions & graphing, systems of equations, polynomials & factoring, quadratics, exponential functions, and data & statistics.
- **Detailed Answer Explanations** — every question includes a step-by-step solution so you can understand the reasoning.
- **Formula Reference Sheet** — essential Algebra 1 formulas and key concepts for quick review before each test.
- **Test Tracker** — log your scores across all 7 tests and monitor your improvement over time.

Your 7-Test Battle Plan

★ PHASE 1: DISCOVER (Tests 1–2)

Untimed. Find your strengths and weaknesses. Review every answer explanation.

★★ PHASE 2: BUILD (Tests 3–4)

Soft timer (120 min). Start practicing pacing and time management.

★★★ PHASE 3: SHARPEN (Tests 5–6)

Timed, strict. Speed + accuracy together. Show complete solutions.


🏆 PHASE 4: PROVE IT (Test 7)

Full test conditions: timed, quiet, no notes. Compare with Test 1.

Tip: Space tests 4–5 days apart. Use the days between to study the topics you missed.

 **Types of Questions**

 **Multiple Choice:** Four answer options — only one is correct. Eliminate clearly wrong options to improve your odds.

 **Short Answer & Constructed Response:** Show all your work: equations, substitutions, and simplifications. Even a partial solution can earn credit.

 **Graphing & Data:** Plot points, draw lines, interpret scatter plots and data displays. Use a ruler and label everything clearly.



Tip: With 7 tests, you have the depth to truly master every chapter. Don't rush through them — quality review between tests is what drives real improvement.



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💡 Test-Taking Tips 💡

A problem-solving checklist for every question

Your Problem-Solving Checklist

- I read the entire problem and identified what is given and what is asked.
- I wrote the equation or formula before substituting any numbers.
- I solved step by step and showed every operation.
- I checked my answer by plugging it back in or estimating.
- I re-read the question to make sure I answered exactly what was asked.
- I labeled my answer with correct units or notation.

Common Mistakes in Algebra 1

-  **Combining like terms:** $3x + 2y \neq 5xy$. Only combine terms with the same variable and exponent.
-  **Exponent rules:** $x^2 \cdot x^3 = x^5$ (add exponents), but $(x^2)^3 = x^6$ (multiply exponents).
-  **Inequality direction:** When multiplying or dividing by a negative, flip the inequality sign.
-  **Function notation:** $f(3)$ means the output when input is 3, not $f \times 3$.
-  **Quadratic formula:** The denominator is $2a$, not just a . Don't forget the \pm .

Smart Strategies

- Answer the questions you're most confident about first
- Underline keywords: "solve," "simplify," "factor," "graph," "explain"
- For word problems, define your variable and translate step by step
- When graphing, always plot at least two points and connect with a ruler
- When stuck, skip and come back — fresh eyes often see the solution

 **After Each Test**

- Read the full explanation for every wrong answer
- Note the chapter (not just the question number) so you know what to study
- Before the next test, review those chapters until you understand them
- Log your results in the Test Tracker



“ Every wrong answer is a learning opportunity. After each test, go back and understand not just **what** the right answer is, but **why** your approach didn't work. ”



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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

Seven tests allow for deep, thorough preparation. Plan one test every 4–5 days with study sessions in between.

How to help:

- Tests 1–2 should be untimed — let your student explore and learn.
- After each test, review the answer explanations together. Focus on the chapter, not just individual questions.
- Use the Test Tracker to visualize progress across all 7 tests.
- For extra topic support, pair this book with our **Algebra 1 Study Guide** or **Algebra 1 Workbook**.

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 growth

Name: _____

Start Date: _____

Test 1 – Untimed

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 2 – Untimed

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 3 – Soft Timer – 120 min

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 4 – Timed

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 5 – Timed

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 6 – Timed – Strict

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Test 7 – Full Test Conditions

Date: _____

Score: _____ / _____

%: _____

Notes: _____

Score Progress



Shade each bar after every test. Watch your progress!

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 sum of two numbers is 14 and one number is 4 more than the other. What are the two numbers?

Your Answer:

2. The table below shows an equation with a missing exponent n . Use the rules of exponents to find the value of n .

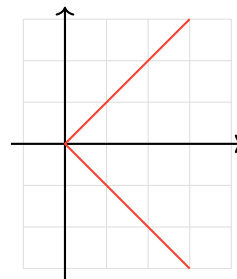
Numerator	Denominator	Result
$x^8 \cdot x^n$	x^3	x^9

Your Answer:

3. Which graph below represents a function?



Graph I



Graph II

(A) Graph I only

(B) Graph II only

(C) Both Graph I and Graph II

(D) Neither Graph I nor Graph II

4. How many solutions does $4(2x + 3) = 2(4x - 1)$ have?

Your Answer:



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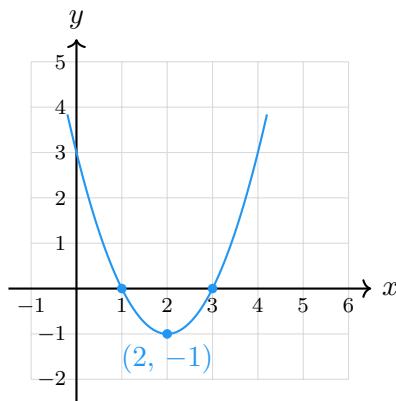
5. What type of boundary line does $y \geq \frac{3}{4}x - 1$ have?

Your Answer:

6. A car is bought for \$18,000 and loses 10% of its value each year. What is the car's value after 5 years? Round to the nearest dollar.

Your Answer:

7. Use the quadratic formula to solve the equation represented by the parabola below. The equation is $x^2 - 4x + 3 = 0$.



Your Answer:

8. Expand $(x + 6)^2$. Write the result in standard form.

Your Answer:



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9. Given $f(x) = 4x - 3$ and $g(x) = x + 7$, what is $f(2) + g(2)$?

(A) 14

(B) 12

(C) 16

(D) 18

10. A car's value decreases by approximately 15% each year. Which model type best describes this depreciation?

(A) Linear, because the value decreases at a constant rate.

(B) Quadratic, because the value decreases and then increases.

(C) Exponential decay, because the value decreases by a constant percentage each year.

(D) No model is appropriate for depreciation.



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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 9 and 5

2 4

3 A

4 no solution

5 Solid

6 \$10,629

7 $x = 1$ and $x = 3$

8 $x^2 + 12x + 36$

9 A

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 Let $x + y = 14$ and $x = y + 4$. Substitute: $(y + 4) + y = 14$, so $2y = 10$ and $y = 5$. Then $x = 9$. The two numbers are 9 and 5.

2 Using the product rule in the numerator: $x^8 \cdot x^n = x^{8+n}$. Then the quotient rule: $\frac{x^{8+n}}{x^3} = x^{8+n-3} = x^{n+5}$. Setting $x^{n+5} = x^9$ gives $n + 5 = 9$, so $n = 4$.



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3 Graph I shows a V-shape; every vertical line crosses it at most once, so it is a function. Graph II shows a sideways V; a vertical line at $x = 2$ crosses it at two points (one above and one below the x -axis), so it is not a function.

4 Distribute: $8x + 12 = 8x - 2$. Subtract $8x$: $12 = -2$. This is a false statement, so the equation has no solution.

5 The symbol \geq includes equality, so points on the boundary line are solutions. A solid line is used for \leq or \geq .

6 The decay factor is $b = 1 - 0.10 = 0.90$. After 5 years: $f(5) = 18,000(0.90)^5 = 18,000 \times 0.59049 \approx \$10,629$.

7 With $a = 1$, $b = -4$, $c = 3$, the discriminant is $D = 16 - 12 = 4$. Then $x = \frac{4 \pm 2}{2}$, giving $x = 3$ or $x = 1$. These match the x -intercepts on the graph.

8 Use the square of a sum pattern: $(x + 6)^2 = x^2 + 2(x)(6) + 6^2 = x^2 + 12x + 36$.

9 Evaluate each function at $x = 2$: $f(2) = 4(2) - 3 = 5$ and $g(2) = 2 + 7 = 9$. Then $f(2) + g(2) = 5 + 9 = 14$.

10 A constant percentage decrease each year means the car retains 85% of its value annually, giving the model $V = V_0(0.85)^t$. This is exponential decay because each year the amount lost is a fixed fraction of the current value, not a fixed dollar amount.



Well done checking your answers!

Keep practicing to strengthen your skills.

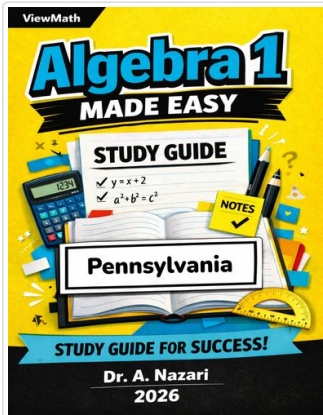


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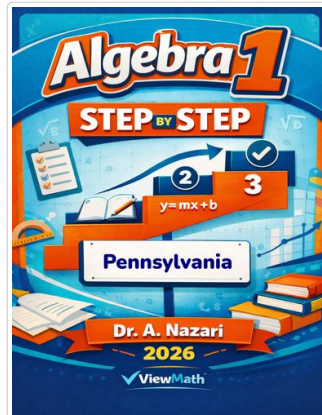
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Study Guide



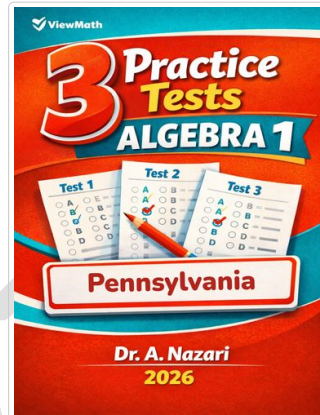
Scan Me



Step-by-Step



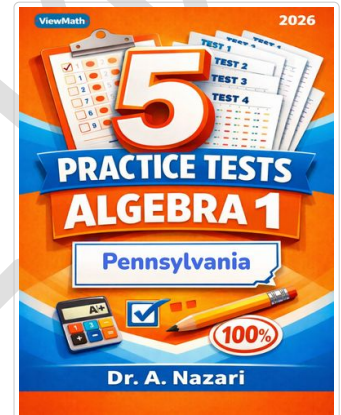
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3 Practice Tests



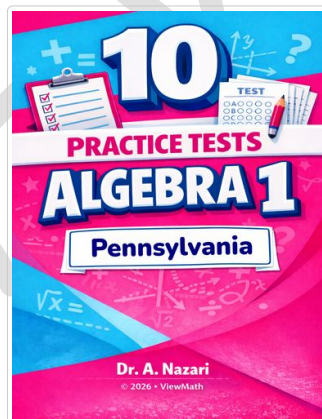
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5 Practice Tests



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10 Practice Tests



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