

5 Full-Length North Dakota NDSA Grade 9 Math Practice Tests

Extra Practice for Test Day Success

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Published by View Math Education

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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:

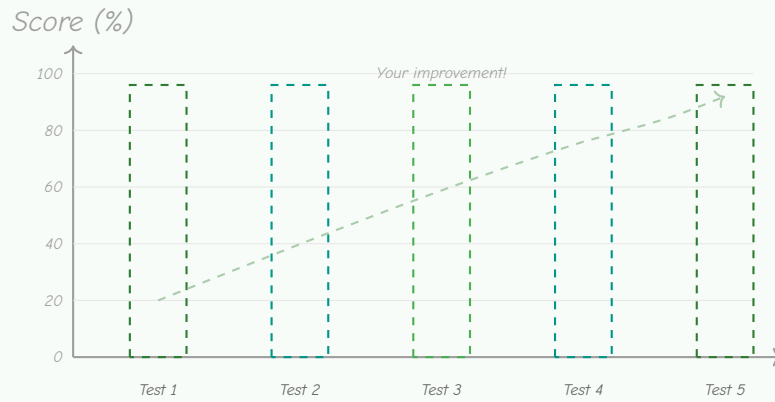
Test 4 (Timed)

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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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. How many points on the graph share the same x -coordinate as another point?



Your Answer:

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

Your Answer:

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

(A) $-x^3$

(B) $-3x$

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

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

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

Your Answer:



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5. 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

6. A data set is modeled by $y = 2x^2 + 3$. At $x = 3$, the actual value is 20. What is the residual?

(A) -1

(B) 1

(C) 2

(D) -2

7. 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:



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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 2 | 2 $a^2 + b^2$ | 3 C | 4 5 | 5 D | 6 A | 7 \$67.50 | 8 A |
| 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 The points (4, 1) and (4, 4) both have $x = 4$. Those 2 points share the same x -coordinate, which means a vertical line at $x = 4$ hits the graph twice and the relation is not a function.

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



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3 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.

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

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

6 Predicted: $y = 2(3)^2 + 3 = 2(9) + 3 = 21$. Residual = actual - predicted = $20 - 21 = -1$. The actual value is 1 below the model's prediction.

7 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 .

8 Substitute $t = 1$: $h(1) = -16(1)^2 + 48(1) + 4 = -16 + 48 + 4 = 36$. The ball is 36 units high after 1 second.

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

10 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 $x = \frac{-6}{6} = -1$.



Well done checking your answers!

Keep practicing to strengthen your skills.

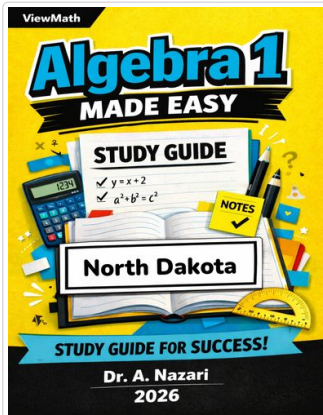


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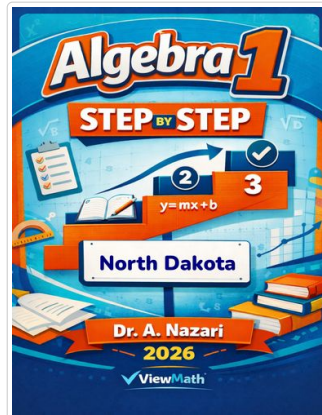
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Study Guide



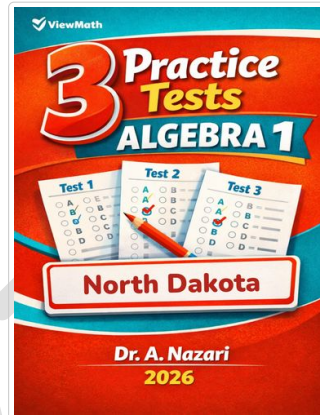
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Step-by-Step



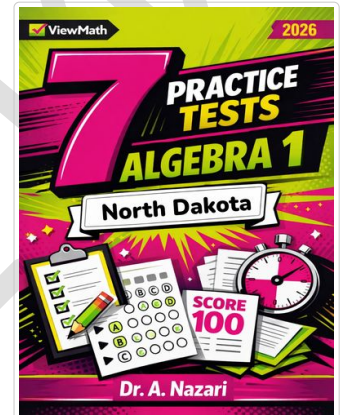
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3 Practice Tests



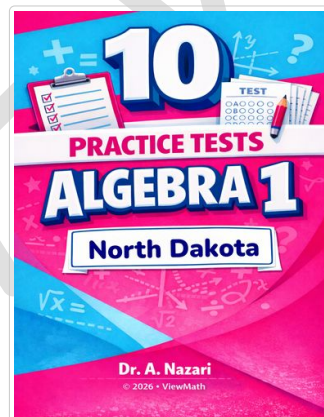
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7 Practice Tests



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10 Practice Tests



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