

10 Full-Length North Dakota Algebra 2 Practice Tests

Complete Test Prep with Detailed Answer Explanations

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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

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

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



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

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

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

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

- | | | | |
|---|---------------------------------|---|-------------------------------------|
| ✓ | 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

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

Usually not allowed

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

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

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

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 2×2 , 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

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

$$\text{Amplitude: } |A|$$

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

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

$$\text{Phase shift: } C$$

$$\text{Midline: } y = D$$

$$\text{Max/min: } D \pm |A|$$

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

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

$$\text{Independent: } P(A \cap B) = P(A)P(B)$$

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

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

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

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

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

$$\text{Simple interest: } I = Prt$$

$$\text{Future amount: } A = P + I$$

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

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

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

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

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)

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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. Simplify $5(2y - 1) - 3(y + 4)$.

(A) $7y - 17$

(B) $7y + 7$

(C) $13y - 17$

(D) $10y - 15$

2. A linear model is $C = 45 + 12n$. What does 12 represent?

(A) initial cost

(B) rate per item

(C) maximum value

(D) number of items

3. Which is the most precise classification of $\sqrt{49}$?

(A) integer

(B) whole number

(C) natural number

(D) irrational number

4. What is the value of $3(2^3 - 5) + 4$?

(A) 13

(B) 17

(C) 31

(D) 85



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5. Use the table to find the average rate of change from $t = 1$ to $t = 4$.

| t | $h(t)$ |
|-----|--------|
| 1 | 18 |
| 2 | 22 |
| 3 | 26 |
| 4 | 30 |

(A) 3

(B) 4

(C) 8

(D) 12

6. Use substitution to solve $y = x + 4$ and $2x + y = 19$.

(A) (5, 9)

(B) (9, 5)

(C) (4, 8)

(D) (7, 11)

7. A taxi charges $5 + 2m$ dollars for m miles. How many miles cost 31 dollars?

(A) 13

(B) 15.5

(C) 18

(D) 26

8. If $f(x) = -2x + 10$, what is $f(4)$?

(A) 2

(B) 6

(C) 12

(D) 18



9. What is the range of $f(x) = x^2 + 3$?

(A) $y \geq 3$

(B) $y \leq 3$

(C) all real numbers

(D) $x \geq 3$

10. Factor $x^2 + 7x + 12$.

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

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

(C) $(x + 2)(x + 6)$

(D) $(x + 1)(x + 12)$

PREVIEW



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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 A 2 B 3 C 4 A 5 B 6 A 7 A 8 A 9 A
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 Distribute first to get $10y - 5 - 3y - 12$, and combine like terms to get $7y - 17$.
- 2 In a linear model, the coefficient of the input is the rate of change, so 12 is the cost added per item.
- 3 Since $\sqrt{49} = 7$, the value is a counting number; natural is more precise than whole, integer, or rational.



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- 4 Evaluate the exponent first: $2^3 = 8$, so $3(8 - 5) + 4 = 9 + 4 = 13$.
- 5 The output changes from 18 to 30 over 3 input units, so the average rate is $\frac{12}{3} = 4$.
- 6 Substitute $x + 4$ for y to get $3x + 4 = 19$, so $x = 5$ and $y = 9$.
- 7 Solve $5 + 2m = 31$ by subtracting 5 and dividing by 2, giving $m = 13$.
- 8 Substitute 4 for x : $f(4) = -2(4) + 10 = 2$.
- 9 The least value of x^2 is 0, so the least output is 3 and the range is $y \geq 3$.
- 10 The numbers 3 and 4 multiply to 12 and add to 7, so the factorization is $(x + 3)(x + 4)$.



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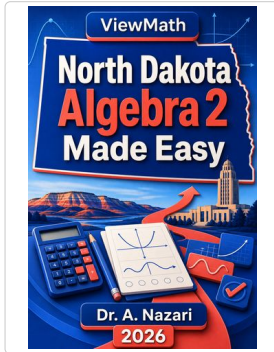


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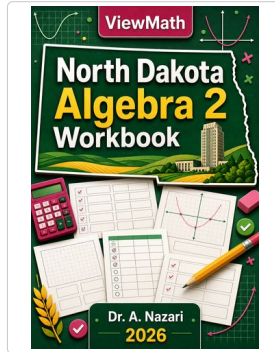
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Study Guide



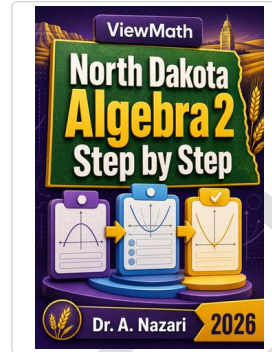
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Workbook



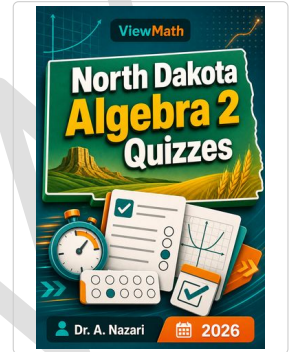
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Step-by-Step



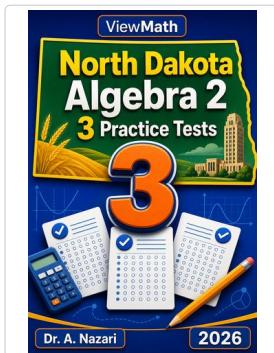
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Quizzes



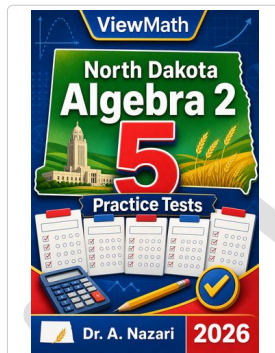
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3 Practice Tests



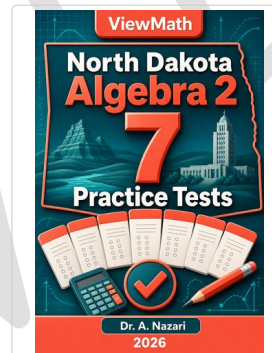
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5 Practice Tests



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7 Practice Tests



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Math in 30 Days



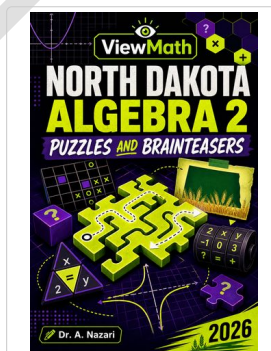
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Math in 10 Days



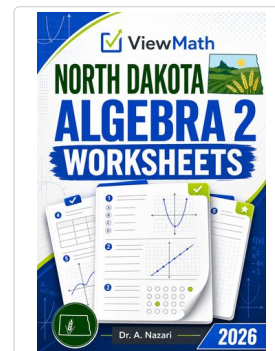
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