

7 Full-Length North Dakota Algebra 2 Practice Tests

Comprehensive Test Prep with Detailed Answer Explanations

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Published by View Math Education

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Welcome to Your Practice Book

7 full-length Algebra 2 tests for deeper preparation and review

Welcome!

This book gives you **7 full-length Algebra 2 practice tests** with detailed answer explanations. Use each test as a rehearsal: work steadily, check your answers only at the end, study your mistakes, and use the next test to measure progress.

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

Use the tests like checkpoints: try, study, retry, and watch the pattern improve.

log

1
Try

2
Study

3
Retest

“ Simulate real test conditions: quiet space, timer on, no notes, and answers checked only at the end. ”





How to Use This Book



A 7-test path from diagnosis to mastery

What is inside

7 full-length practice tests

Each test samples all major Algebra 2 chapters, including functions, quadratics, polynomials, rational and radical expressions, exponential and logarithmic models, sequences, matrices, trigonometry, conics, statistics, probability, and finance.

Step-by-step explanations

Treat every missed question as a study assignment. The explanations show the reasoning that should appear in your own work.

Reference sheet and score tracker

Keep formulas close, then record scores and review topics after each test.

Question types

Multiple Choice

Use structure: signs, restrictions, graph behavior, and units can rule out bad options.

Short Answer

Write the method clearly enough that another person can follow your steps.

Graphing & Data

Mark scale, intercepts, key features, and what the model means in context.

Seven-test rhythm



Suggested pacing: Take tests 4–5 days apart. Keep a running list of weak topics so your review becomes more focused each week.

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: $a_n = a_{n-1} + d$

Arithmetic sum: $S_n = \frac{n(a_1 + a_n)}{2}$

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

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

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

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	_____	_____	_____	_____

Review pattern

Tests 1–2

Discover strengths and weak chapters.

Tests 3–6

Build pacing while closing topic gaps.

Test 7

Run a final test-day rehearsal.

Track your progress and save your scores on [ViewMath.com](https://www.viewmath.com)

Scan the QR code to enter scores, save progress, and review weak topics.

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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. Which equation is equivalent to $9x + 6 = 33$?

(A) $9x = 27$

(B) $9x = 39$

(C) $x + 6 = 33$

(D) $15x = 33$

2. Which table represents a linear function?

(A) y changes by 2, 4, 8

(B) y changes by 5, 5, 5

(C) y changes by 1, 3, 5

(D) y changes by 2, 6, 18

3. What is the simplified form of $(2x^2)^3$?

(A) $6x^5$

(B) $8x^6$

(C) $8x^5$

(D) $2x^6$

4. Which pair of terms can be combined?

(A) $3x^2$ and $3x$

(B) $-5ab$ and $2ab$

(C) $4m$ and $4n$

(D) 7 and $7y$

5. Which domain is reasonable for selling n tickets at 8 dollars each?

(A) all real numbers

(B) negative integers

(C) whole numbers

(D) irrational numbers

6. What is the slope of the line through $(2, 5)$ and $(6, 13)$?

(A) 2

(B) $\frac{1}{2}$

(C) 4

(D) 8



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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 B 4 B 5 C 6 A 7 C 8 A 9 B
10 B

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

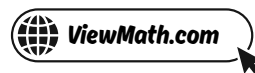
- 1 Subtracting 6 from both sides preserves the solution set and gives $9x = 27$.
- 2 A linear function has a constant rate of change, so equal input steps must produce equal output changes.
- 3 Raise the coefficient and the power: $(2x^2)^3 = 2^3x^6 = 8x^6$.



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- 4 Like terms must have exactly the same variable part, so $-5ab$ and $2ab$ can be combined.
- 5 The number of tickets must be countable and cannot be negative, so whole numbers are the reasonable domain.
- 6 Slope is change in y over change in x : $\frac{13-5}{6-2} = \frac{8}{4} = 2$.
- 7 Natural numbers are counting numbers, so 6 belongs in the smallest inner set while 0, negatives, and fractions do not.
- 8 Multiplying an equation by a nonzero constant creates an equivalent equation, so it preserves the solution set.
- 9 The absolute value parent $y = |x|$ forms two rays meeting at a vertex, creating a V shape.
- 10 The product is positive outside the zeros -3 and 1 , where both factors have the same sign.

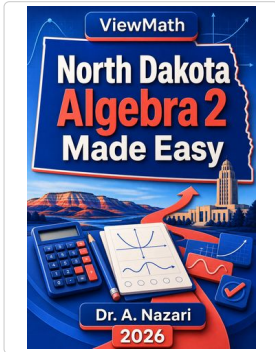


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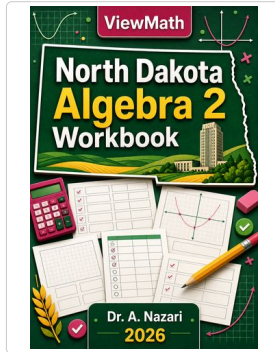
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Study Guide



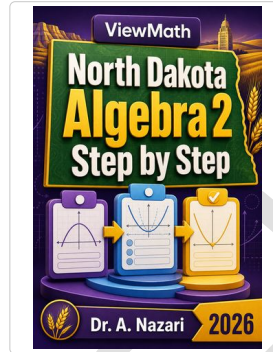
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Workbook



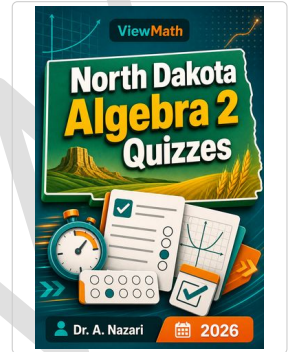
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Step-by-Step



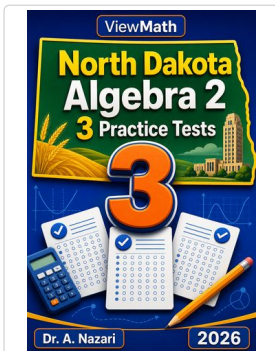
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Quizzes



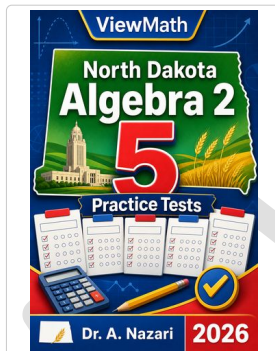
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3 Practice Tests



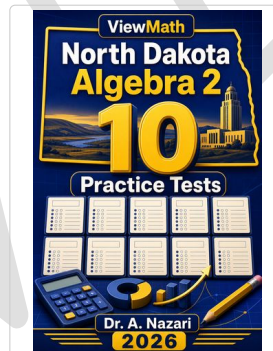
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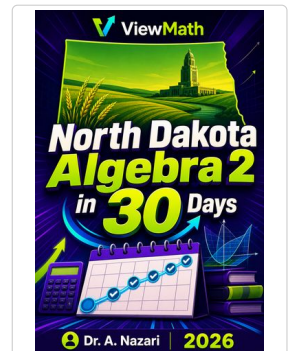
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10 Practice Tests



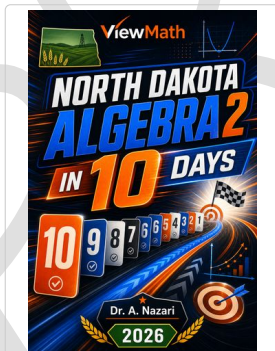
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Math in 30 Days



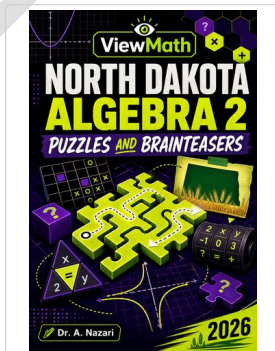
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Math in 10 Days



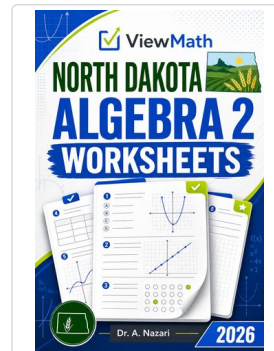
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