

# Nebraska Algebra 2 Summer Workbook

*8-Week Skills Practice with Quick Reviews and Answer Explanations*

**Dr. A. Nazari**

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# Algebra 2 Summer Workbook



**This workbook gives students a steady way to keep Algebra 2 skills sharp without turning summer review into a long study session.**

Each week builds from four focused practice days to one mixed review day. Students revisit functions, systems, quadratics, polynomials, rational and radical expressions, exponential and logarithmic models, trigonometry, conics, statistics, probability, and finance with concise Quick Reviews and teaching answer explanations.



## For families and teachers

Use one practice day at a time, about 15-25 minutes. Let students attempt the page first, then use the explanations to reteach the problems that were missed, guessed, or left unfinished.

## For students

Show the setup, label graphs clearly, and correct mistakes in pencil. The goal is to enter the next math course with Algebra 2 ideas feeling familiar and usable.

# How to Use This Workbook

## The weekly routine does the organizing for you.

Move through the workbook in order. Four days each week focus on connected Algebra 2 skills, and the fifth day mixes those skills so students practice choosing a method from the problem itself.



**Practice days** Read the Quick Review, study the model, and work through each section with organized algebra, clear graph labels, and exact notation.

**Mixed review day** Complete the Friday page without relying on the lesson title. Decide whether the problem needs an equation, graph, table, identity, formula, or interpretation.

**Check answers** Read the explanation for every missed, guessed, or uncertain problem. Correct the reasoning, not only the final answer.

**Extra support** If a skill still feels weak, redo one similar problem the next day before starting the new page.



### Keep it focused

Most practice days should fit into 15–25 minutes. Stop and review when work turns into guessing.



### Show structure

Write substitutions, restrictions, transformations, units, and graph features so the work can be checked.



### Learn from fixes

Use the answer key as a short reteach. A corrected error is one of the strongest review steps.

# ✓ My Summer Workbook Progress

Check off each practice day and write your Friday mixed review score.

This workbook belongs to: \_\_\_\_\_

Week	Day 1	Day 2	Day 3	Day 4	Mixed Review
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____

## Reflection Notes

After a mixed review, write the question number, what happened, and one reminder for next time. Use this space for skills that need another look, especially graph interpretation, restrictions, identities, and modeling choices.

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# Algebra 2 Reference Sheet



High-yield formulas to keep nearby during summer workbook practice.

## 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

$a \cdot f(x)$ : 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:  $y = a(x - r_1)(x - r_2)$

$$\text{Axis: } x = -\frac{b}{2a}$$

$$\text{Formula: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant:  $b^2 - 4ac$

$$\text{Roots: } r_1 + r_2 = -\frac{b}{a}, r_1 r_2 = \frac{c}{a}$$

## 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

$$\log_b(x) = y \leftrightarrow b^y = x$$

$$\log_b(MN) = \log_b M + \log_b N$$

$$\log_b(M/N) = \log_b M - \log_b N$$

$$\log_b(M^p) = p \log_b M$$

$$\text{Change base: } \log_b x = \frac{\log x}{\log b}$$

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  $2 \times 2$ , determinant  $ad - bc$ .



# Algebra 2 Reference Sheet



Trig, conics, data, probability, and modeling reminders

## Trigonometry

Unit point:  $(\cos \theta, \sin \theta)$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$\sin = \frac{\text{opp}}{\text{hyp}}, \cos = \frac{\text{adj}}{\text{hyp}}, \tan = \frac{\text{opp}}{\text{adj}}$$

Sine/cosine period:  $\frac{2\pi}{|b|}$

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

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

Amplitude:  $|A|$

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

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

Phase shift:  $C$

Midline:  $y = D$

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

$$\text{IQR: } Q_3 - Q_1$$

$$\text{Outlier fence: } Q_1 - 1.5(IQR), Q_3 + 1.5(IQR)$$

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

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

Independent:  $P(A \cap B) = P(A)P(B)$

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.

**Day 1 Real Numbers, Properties, and Expressions**

**SKILL SNAPSHOT**

Algebra 2 foundations start with careful structure: classify numbers, read notation, simplify by properties, and substitute with parentheses.

- ✓ Number sets are nested: natural, whole, integer, rational, and real.
- ✓ Interval notation uses brackets for included endpoints and parentheses for excluded endpoints.
- ✓ Order of operations controls the order of simplifying an expression.
- ✓ Properties such as distributive, commutative, and associative justify equivalent rewrites.
- ✓ Negative exponents move a factor across the fraction bar; they do not make the value negative.
- ✓ Combine only like terms with exactly the same variable part.

**Remember:** When you substitute a negative number or expression, use parentheses first and simplify one step at a time.

**☰ Classify and write real-number sets.**

- 1 Classify  $\sqrt{100}$  as precisely as possible. A. -8 B. 0.4
- 2 Classify  $-\frac{7}{4}$  as rational or irrational. C.  $\sqrt{18}$  D.  $\frac{11}{5}$
- 3 Which number is irrational? 4 True or False: Every integer is a rational number.  True  False
- 5 Use the nesting diagram to choose the smallest set for 0.

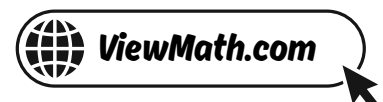


**☰ Use interval notation and inequalities.**

- 6 Write  $\{x \mid -3 \leq x < 4\}$  in interval notation. \_\_\_\_\_
- 7 Write  $(-\infty, 2]$  as an inequality. \_\_\_\_\_



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- 8 Use the number line to write the interval.



**Simplify expressions with properties and exponents.**

- 9 Evaluate  $5 + 2(3^2 - 4)$ . \_\_\_\_\_
- 10 Simplify  $6(2x - 3) - 4x$ . \_\_\_\_\_
- 11 Simplify  $(3x^4y^{-1})(2x^{-2}y^5)$  with positive exponents.
- 12 Write  $\frac{a^{-3}b^2}{b^{-1}}$  with positive exponents.

**Evaluate and interpret expressions.**

- 13 Evaluate  $2a^2 - 3b$  when  $a = -3$  and  $b = 4$ . \_\_\_\_\_
- 15 A table shows  $x$  and  $3x^2 - 1$ . Fill in the missing value for  $x = -2$ .

- 14 If  $P = 2l + 2w$ , find  $P$  when  $l = 8.5$  and  $w = 3$ . \_\_\_\_\_

$x$	-2	0	3
$3x^2 - 1$	_____	-1	26

- 16 An expression for the total cost of  $n$  notebooks is  $4n + 6$ , where 6 is a shipping fee. What does the 4 represent?



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**Day 2 Equations, Inequalities, and Absolute Value****SKILL SNAPSHOT**

Equations and inequalities are solved by undoing operations while keeping both sides balanced. Absolute value uses distance, so many problems split into two cases.

- ✓ Use inverse operations to isolate the variable in equations.
- ✓ Do the same operation to both sides to preserve equality or the solution set.
- ✓ Reverse an inequality sign when multiplying or dividing by a negative number.
- ✓ Compound inequalities use "and" for overlap and "or" for separated regions.
- ✓ Absolute value measures distance from 0, so  $|A| = c$  gives  $A = c$  or  $A = -c$ .
- ✓ For  $|A| < c$ , keep the expression between  $-c$  and  $c$ .

**Remember:** Before solving an absolute value problem, decide whether it is equality, less-than, or greater-than; each type has a different structure.

**☰ Solve linear equations.**

- 1 Solve  $4x - 9 = 23$ . \_\_\_\_\_
- 2 Solve  $\frac{m - 5}{3} = 7$ . \_\_\_\_\_
- 3 Solve  $5(2p + 1) - 3p = 26$ . \_\_\_\_\_

**☰ Solve and graph inequalities.**

- 4 Solve  $3x + 4 \leq 19$ . \_\_\_\_\_
- 5 Solve  $-2n + 5 > 17$ . \_\_\_\_\_
- 6 Which interval represents  $x \geq -1$ ?  
 A.  $(-\infty, -1]$       B.  $[-1, \infty)$   
 C.  $(-1, \infty)$       D.  $[-1, 1]$
- 7 True or False: Solving  $-5x \leq 20$  gives  $x \leq -4$ .  
 True     False
- 8 Graph  $x < -2$  on the number line.
- 

**☰ Compound inequalities and intervals.**

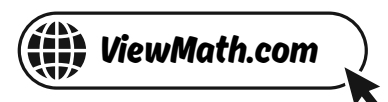
- 9 Solve  $-4 < 2x + 6 \leq 14$ .  
 \_\_\_\_\_
- 10 Write  $x < -3$  or  $x \geq 2$  in interval notation.  
 \_\_\_\_\_



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- 11 Use the table to decide which values satisfy  $-1 \leq x < 3$ .

$x$	-2	-1	2	3
satisfies?	_____	_____	_____	_____

 **Solve absolute value equations and inequalities.**

- 12 Solve  $|x - 6| = 4$ . \_\_\_\_\_
- 13 Solve  $|2x + 3| = 11$ .  
\_\_\_\_\_
- 14 Solve  $|x + 1| < 5$ . \_\_\_\_\_
- 15 Solve  $|3x - 2| \geq 10$ .  
\_\_\_\_\_
- 16 A tolerance rule says  $|t - 68| \leq 3$ . What temperatures are allowed?

PREVIEW



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**Day 5 Week 1 Mixed Review****WEEKLY SKILL CHECK**

This review mixes real-number structure, expressions, equations, inequalities, linear functions, systems, and constraints.

- ✓ Classify first, then simplify when a number contains radicals or fractions.
- ✓ Use inverse operations carefully and reverse inequality signs after multiplying or dividing by a negative.
- ✓ Read linear equations with slope and intercept in mind.
- ✓ A system solution must satisfy every equation or inequality at the same time.

**Remember:** On mixed review, identify the problem type before calculating: expression, equation, inequality, line, or system.

**☰ Real numbers and expressions.**

- 1 Classify  $-\sqrt{49}$  as precisely as possible.
- 2 Write  $\{x \mid 1 < x \leq 8\}$  in interval notation.  
\_\_\_\_\_
- 3 Simplify  $3(2x - 5) + 4x$ . \_\_\_\_\_
- 4 Evaluate  $a^2 - 2b$  when  $a = -5$  and  $b = 6$ .  
\_\_\_\_\_

**☰ Equations, inequalities, and absolute value.**

- 5 Solve  $6x - 11 = 25$ . \_\_\_\_\_
- 6 Solve  $-3x + 4 \geq 19$ . \_\_\_\_\_
- 7 Solve  $|x - 2| = 7$ . \_\_\_\_\_
- 8 True or False:  $|x + 4| < 2$  has solution  $-6 < x < -2$ .  
 True  False

**☰ Linear functions.**

- 9 Find the slope through  $(2, -1)$  and  $(6, 11)$ .  
\_\_\_\_\_
- 10 For  $y = -\frac{3}{4}x + 10$ , name the slope and  $y$ -intercept.
- 11 Use the table to write a linear equation.

$x$	0	3	6
$y$	4	13	22



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 **Systems and constraints.**

**13** Solve  $x + y = 10$  and  $x - y = 2$ .

**14** Which point satisfies  $x + y \leq 7$  and  $y \geq 2$ ?

**A.** (6, 0)

**B.** (4, 3)

**C.** (8, 2)

**D.** (1, 1)

**15** A taxi charges \$5 plus \$2.75 per mile. Write a model and find the cost for 8 miles.

**16** Adult tickets cost \$9, student tickets cost \$5, and 24 tickets cost \$164. How many adult tickets were sold?



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**Week 1 Day 5 Answer Key** Real Numbers, Properties, and Expressions

**Answers**

- 1 natural number    2 rational    3 C    4 True    5 whole number    6  $[-3, 4)$   
 7  $x \leq 2$     8  $(-2, 3]$     9 15    10  $8x - 18$     11  $6x^2y^4$     12  $\frac{b^3}{a^3}$     13 6    14 23  
 15 11    16 The cost per notebook is \$4.

**Explanations**

- 1 First simplify the radical:  $\sqrt{100} = 10$ . Since 10 is a counting number, the most precise set is natural numbers, even though it also belongs to larger sets.
- 2 A rational number can be written as a ratio of integers. The number  $-\frac{7}{4}$  is already written in fraction form, so it is rational.
- 3 The number 18 is not a perfect square, so  $\sqrt{18}$  cannot be written as a terminating or repeating decimal. The other choices are integers, decimals, or fractions, so they are rational.
- 4 Any integer can be written over 1, such as  $-6 = \frac{-6}{1}$ . Because it can be written as a fraction of integers, every integer is rational.
- 5 The diagram shows 0 inside the whole-number region. It is also an integer, rational, and real, but whole number is the smallest named set shown.
- 6 The endpoint  $-3$  is included, so it uses a bracket. The endpoint 4 is not included, so it uses a parenthesis.
- 7 The interval includes all numbers up to 2. The bracket at 2 means 2 is included, so the inequality is  $x \leq 2$ .
- 8 The open circle at  $-2$  means  $-2$  is not included, so use a parenthesis. The closed circle at 3 means 3 is included, so use a bracket.
- 9 Use order of operations inside the parentheses first:  $3^2 = 9$ , and  $9 - 4 = 5$ . Then  $2(5) = 10$ , and  $5 + 10 = 15$ .
- 10 Distribute 6 to get  $12x - 18 - 4x$ . Combine like terms  $12x - 4x = 8x$ , so the expression is  $8x - 18$ .
- 11 Multiply coefficients and add exponents on matching bases:  $3 \cdot 2 = 6$ ,  $x^{4+(-2)} = x^2$ , and  $y^{-1+5} = y^4$ . All exponents are positive in the final form.
- 12 The factor  $a^{-3}$  moves to the denominator as  $a^3$ . Dividing by  $b^{-1}$  is the same as multiplying by  $b^1$ , so  $b^2 \cdot b = b^3$ .
- 13 Substitute with parentheses:  $2(-3)^2 - 3(4)$ . The square is 9, so  $18 - 12 = 6$ .
- 14 Substitute the length and width into the formula:  $P = 2(8.5) + 2(3)$ . This gives  $17 + 6 = 23$ .
- 15 Substitute  $-2$  using parentheses:  $3(-2)^2 - 1$ . Since  $(-2)^2 = 4$ , the value is  $3(4) - 1 = 11$ .



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- 16 The term  $4n$  changes with the number of notebooks, so 4 is the unit rate. The 6 is fixed because it is added once as shipping.

**Week 1 Day 5 Answer Key** Equations, Inequalities, and Absolute Value

**Answers**

- 1  $x = 8$     2  $m = 26$     3  $p = 3$     4  $x \leq 5$     5  $n < -6$     6 B    7 False
- 8 Open circle at  $-2$ , shaded left.    9  $-5 < x \leq 4$     10  $(-\infty, -3) \cup [2, \infty)$     11 No, Yes, Yes, No
- 12  $x = 2$  or  $x = 10$     13  $x = 4$  or  $x = -7$     14  $-6 < x < 4$     15  $x \leq -\frac{8}{3}$  or  $x \geq 4$
- 16  $65 \leq t \leq 71$

**Explanations**

- 1 Add 9 to both sides to get  $4x = 32$ . Divide by 4, so  $x = 8$ .
- 2 Multiply both sides by 3 to undo the division:  $m - 5 = 21$ . Add 5 to both sides to get  $m = 26$ .
- 3 Distribute first:  $10p + 5 - 3p = 26$ , so  $7p + 5 = 26$ . Subtract 5 and divide by 7 to get  $p = 3$ .
- 4 Subtract 4 from both sides to get  $3x \leq 15$ . Divide by positive 3, so the inequality direction stays the same.
- 5 Subtract 5 to get  $-2n > 12$ . Dividing by  $-2$  reverses the inequality, so  $n < -6$ .
- 6 The inequality starts at  $-1$  and goes to the right forever. Because  $-1$  is included, the interval uses a bracket:  $[-1, \infty)$ .
- 7 Dividing by  $-5$  reverses the inequality symbol. The correct solution is  $x \geq -4$ , not  $x \leq -4$ .
- 8 The symbol  $<$  means  $-2$  is not included, so the circle is open. Values less than  $-2$  are to the left on the number line.
- 9 Subtract 6 from all three parts to get  $-10 < 2x \leq 8$ . Divide all parts by 2, giving  $-5 < x \leq 4$ .
- 10 The word "or" means the solution has two separated intervals. The endpoint  $-3$  is excluded, and 2 is included.
- 11 The interval includes  $-1$  because of  $\leq$ , and it includes values less than 3. It does not include  $-2$ , which is too small, or 3, which is excluded by  $<$ .
- 12 Split the equation into  $x - 6 = 4$  or  $x - 6 = -4$ . Solving gives  $x = 10$  or  $x = 2$ , both four units from 6.
- 13 Write two cases:  $2x + 3 = 11$  and  $2x + 3 = -11$ . These solve to  $x = 4$  and  $x = -7$ .
- 14 A less-than absolute value inequality means the expression is between  $-5$  and 5. So  $-5 < x + 1 < 5$ , and subtracting 1 gives  $-6 < x < 4$ .



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- 15 A greater-than absolute value inequality splits outward:  $3x - 2 \leq -10$  or  $3x - 2 \geq 10$ . Solving gives  $x \leq -\frac{8}{3}$  or  $x \geq 4$ .
- 16 The absolute value measures distance from 68. Being within 3 degrees means  $t$  can be as low as  $68 - 3 = 65$  and as high as  $68 + 3 = 71$ .

### Week 1 Day 5 Answer Key Week 1 Mixed Review

#### Answers

- 1 integer      2 (1, 8]      3  $10x - 15$       4 13      5  $x = 6$       6  $x \leq -5$
- 7  $x = -5$  or  $x = 9$       8 True      9 3      10 slope  $-\frac{3}{4}$ ; intercept 10      11  $y = 3x + 4$       12 -1
- 13 (6, 4)      14 B      15  $C = 2.75m + 5$ ; \$27      16 11 adult tickets

#### Explanations

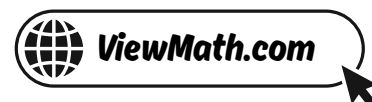
- 1 Simplify first:  $-\sqrt{49} = -7$ . The number  $-7$  is an integer, and that is the most precise set among the common real-number sets.
- 2 The endpoint 1 is not included, so it uses a parenthesis. The endpoint 8 is included, so it uses a bracket.
- 3 Distribute first to get  $6x - 15 + 4x$ . Combine like terms  $6x + 4x = 10x$ , so the expression is  $10x - 15$ .
- 4 Substitute with parentheses:  $(-5)^2 - 2(6)$ . This gives  $25 - 12 = 13$ .
- 5 Add 11 to both sides to get  $6x = 36$ . Divide by 6, so  $x = 6$ .
- 6 Subtract 4 to get  $-3x \geq 15$ . Divide by  $-3$  and reverse the sign, so  $x \leq -5$ .
- 7 Split the absolute value equation into  $x - 2 = 7$  or  $x - 2 = -7$ . Solving gives  $x = 9$  or  $x = -5$ .
- 8 For a less-than absolute value inequality, write  $-2 < x + 4 < 2$ . Subtracting 4 from all parts gives  $-6 < x < -2$ .
- 9 Use  $m = \frac{11 - (-1)}{6 - 2} = \frac{12}{4} = 3$ . The slope is the change in  $y$  divided by the change in  $x$ .
- 10 In slope-intercept form, the coefficient of  $x$  is the slope. The constant term is the  $y$ -intercept.
- 11 The output increases by 9 when  $x$  increases by 3, so the slope is 3. The value at  $x = 0$  is 4, so the intercept is 4.
- 12 From (1, 4) to (4, 1), the change in  $y$  is  $-3$  and the change in  $x$  is 3. The slope is  $-3/3 = -1$ .
- 13 Add the equations to eliminate  $y$ :  $2x = 12$ , so  $x = 6$ . Substitute into  $x + y = 10$  to get  $y = 4$ .
- 14 For (4, 3),  $4 + 3 = 7 \leq 7$  and  $3 \geq 2$ . The other points fail at least one of the two constraints.



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- 15 The fixed charge is the intercept and the per-mile rate is the slope. Substitute  $m = 8$ :  $2.75(8) + 5 = 22 + 5 = 27$ .
- 16 Let  $a + s = 24$  and  $9a + 5s = 164$ . Substitute  $s = 24 - a$ :  $9a + 5(24 - a) = 164$ , so  $4a = 44$ , and  $a = 11$ .

PREVIEW



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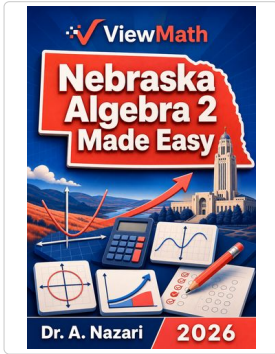


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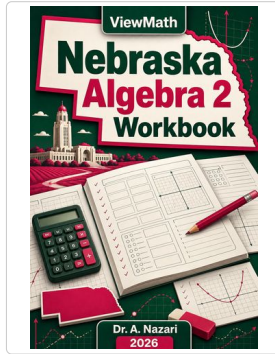
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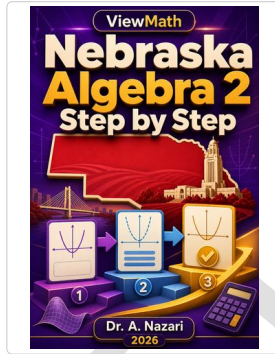
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**Workbook**



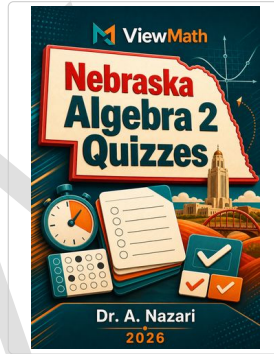
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**Step-by-Step**



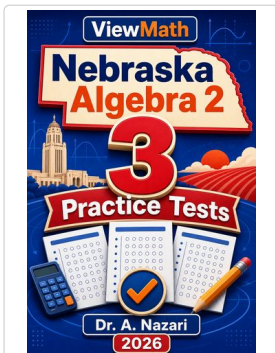
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**Quizzes**



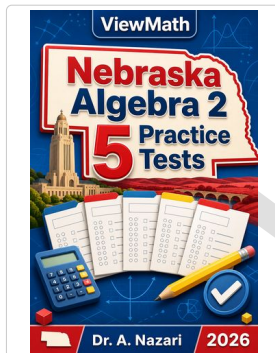
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**3 Practice Tests**



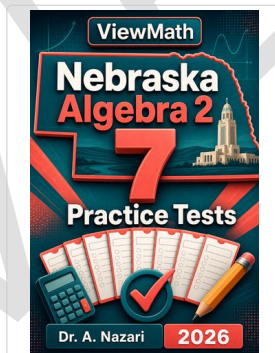
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**5 Practice Tests**



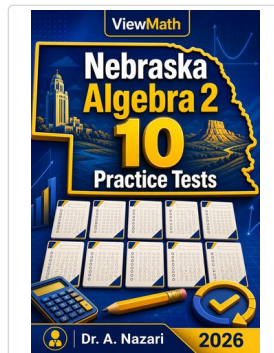
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**7 Practice Tests**



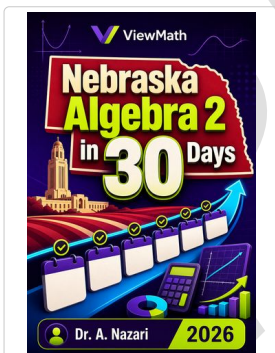
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**10 Practice Tests**



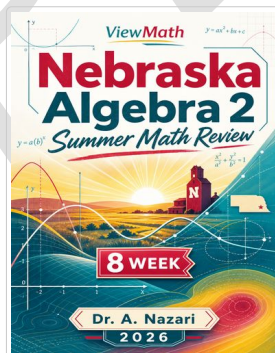
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**Math in 30 Days**



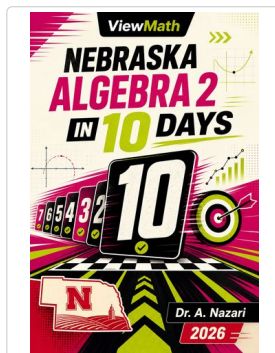
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**Summer Review**



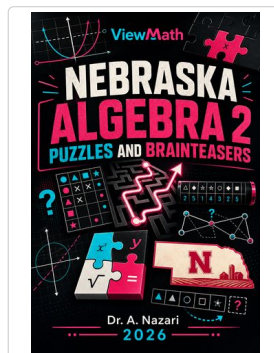
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**Math in 10 Days**



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**Puzzles**



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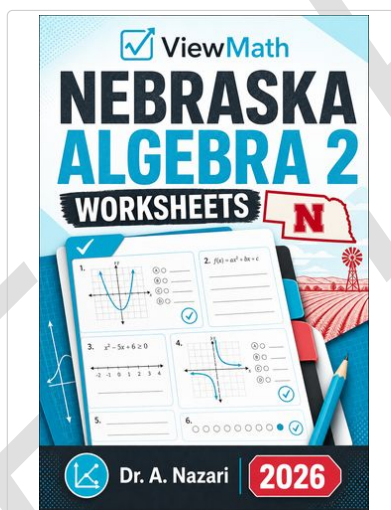


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