☼ Welcome to Summer Math Review! ☼

This 8-week plan reviews the Algebra 1 skills students already learned this year.

How each week works

- Monday through Thursday are short review days.
- Each day starts with a Lesson Review.
- Each practice day has 6 focused Algebra 1 problems.
- Friday is a 10-question quiz.
- Answers explain the algebraic reasoning, not just the final answer.

Try your best first. Then use the answer key like a teacher.

Your 8-Week Summer Review Plan

Use this book four days a week, then take the quiz on Friday.

Weekly Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Day 1	Day 2	Day 3	Day 4	Quiz 1
2	Day 1	Day 2	Day 3	Day 4	Quiz 2
3	Day 1	Day 2	Day 3	Day 4	Quiz 3
4	Day 1	Day 2	Day 3	Day 4	Quiz 4
5	Day 1	Day 2	Day 3	Day 4	Quiz 5
6	Day 1	Day 2	Day 3	Day 4	Quiz 6
7	Day 1	Day 2	Day 3	Day 4	Quiz 7
8	Day 1	Day 2	Day 3	Day 4	Final Quiz

For students

Read the Lesson Review first. Try all 6 problems before checking answers. If you miss one, read the explanation and fix your work.

For parents and teachers

The daily pages are meant to be short. If a student struggles, use the answer explanation as the teaching step, then have the student correct the problem.

Goal

By the end of 8 weeks, students will have completed 192 daily practice problems and 80 quiz questions, with review across the full Algebra 1 course.

Summer Progress Tracker

Check off each day as you finish it.

Week	Mon	Tue	Wed	Thu	Fri Quiz
1	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐
5	☐	☐	☐	☐	☐
6	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐

Small practice adds up.

Four short days and one quiz each week is enough to keep Algebra 1 fresh all summer.

Algebra 1 Reference Sheet

High-yield formulas and rules for summer review

Real Numbers

Natural: $1, 2, 3, \ldots$

Whole: $0, 1, 2, 3, \ldots$

Integers: $\ldots, -2, -1, 0, 1, 2, \ldots$

Rational: fractions; decimals terminate or repeat.

Irrational: decimals do not terminate or repeat.

$\sqrt{\text{perfect square}}$ is rational.

Properties

Commutative: $a + b = b + a, ab = ba$

Associative: $(a + b) + c = a + (b + c)$

Distributive: $a(b + c) = ab + ac$

Identity: $a + 0 = a, a \cdot 1 = a$

Inverse: $a + (-a) = 0, a \cdot \frac{1}{a} = 1$

Like terms have matching variable parts.

Exponents

$a^m \cdot a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^{m-n}$

$(a^m)^n = a^{mn}$

$(ab)^n = a^n b^n$

$a^0 = 1$ for $a \neq 0$

$a^{-n} = \frac{1}{a^n}$

Radicals

$\sqrt{ab} = \sqrt{a}\sqrt{b}$

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

Simplify by factoring out perfect squares.

$\sqrt{50} = \sqrt{25 \cdot 2} = 5\sqrt{2}$

For real even roots, the radicand is nonnegative.

Check whether the final form is exact or decimal.

Equations

Use inverse operations on both sides.

Clear fractions by multiplying by the LCD.

Distribute before combining like terms.

Variables on both sides: move variables first.

Identity: true statement, infinitely many solutions.

Contradiction: false statement, no solution.

Inequalities

Solve like equations.

Flip the sign when multiplying or dividing by a negative.

$x < a$: open circle, shade left.

$x \geq a$: closed circle, shade right.

Compound AND: overlap.

Compound OR: union of two parts.

Functions

Function: each input has exactly one output.

Domain = allowed inputs.

Range = possible outputs.

$f(a)$ means substitute a for x.

Rate of change: $\frac{\Delta y}{\Delta x}$

Vertical line test checks graphs.

Linear

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-intercept: $y = mx + b$

Point-slope: $y - y_1 = m(x - x_1)$

Standard: $Ax + By = C$

Parallel lines have the same slope.

Perpendicular: $m_1 m_2 = -1$

Systems

Solutions are intersections.

Substitution: solve one equation, plug in.

Elimination: align terms, add or subtract.

One solution: different slopes.

No solution: parallel lines.

Infinitely many: same line.

Polynomials

Add/subtract by combining like terms.

Multiply monomials: multiply coefficients, add exponents.

FOIL works for binomials.

Degree = greatest exponent.

Standard form orders powers from greatest to least.

Leading coefficient controls end behavior with degree.

Factoring

GCF first.

Difference of squares: $a^2 - b^2 = (a + b)(a - b)$

Perfect square: $a^2 \pm 2ab + b^2 = (a \pm b)^2$

$x^2 + bx + c$: numbers multiply to c, add to b.

$ax^2 + bx + c$: numbers multiply to ac, add to b.

Zero product: if $ab = 0$, then $a = 0$ or $b = 0$.

Quadratics

Standard: $y = ax^2 + bx + c$

Vertex: $y = a(x - h)^2 + k$

Factored: $y = a(x - r_1)(x - r_2)$

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

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

Discriminant: $b^2 - 4ac$

Exponential

Model: $y = ab^x$

a = initial value.

Growth: $b > 1$.

Decay: $0 < b < 1$.

Percent growth: $b = 1 + r$.

Percent decay: $b = 1 - r$.

Sequences

Arithmetic: add common difference d.

$a_n = a_1 + (n - 1)d$

Geometric: multiply common ratio r.

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

Recursive rules need a starting value.

Table of Contents

Your 8-week summer review plan

A little review each day keeps math fresh!

WEEK 1

Foundations and Equations

Review real numbers, exponent rules, radicals, and linear equations.

In This Week

Day 1	The Real Number System and Properties
Day 2	Laws of Exponents
Day 3	Square Roots and Radicals
Day 4	Solving Linear Equations
Quiz	Foundations and Equations Check

Week 1 Day 1

The Real Number System and Properties

Every Algebra 1 number is a **real number**. Real numbers are either rational or irrational.

- Rational numbers can be written as a ratio of integers. Their decimals terminate or repeat.
- Integers, whole numbers, and natural numbers are nested inside the rational numbers.
- Irrational numbers, such as $\sqrt{2}$ and π, do not terminate or repeat.
- Properties of real numbers justify legal algebra moves.
- Use the distributive property to expand: $a(b+c) = ab + ac$.
- Combine like terms only when the variable parts match exactly.

A square root is rational when the radicand is a perfect square, like $\sqrt{49} = 7$.

Practice

1. List every real-number set that $-\sqrt{49}$ belongs to.

2. Is $\dfrac{\sqrt{18}}{\sqrt{2}}$ rational or irrational? _____

3. Which number is irrational?

A. $0.\overline{4}$ **B.** $-\dfrac{5}{8}$

C. $\sqrt{50}$ **D.** $\sqrt{121}$

4. Name the property shown: $4(2x-7) = 8x - 28$. _____

5. Simplify $6y + 9 + 4y - 2$. _____

6. True or False: A rational number plus an irrational number is always irrational.

☐ True ☐ False

WEEK 3

Slope and Linear Graphs

Review slope, writing lines, graphing lines, and parallel and perpendicular relationships.

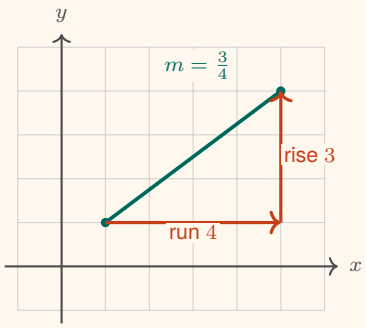
In This Week

Day 1	Rate of Change and Slope
Day 2	Writing Linear Equations
Day 3	Graphing Linear Functions
Day 4	Parallel and Perpendicular Lines
Quiz	Slope and Linear Graphs Check

Week 3 Day 1 Rate of Change and Slope

Slope measures rate of change: how much y changes for each change in x.

- Use $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ for two points.
- Positive slope rises left to right; negative slope falls left to right.
- Zero slope is horizontal; undefined slope is vertical.
- In a table, compare changes in y to matching changes in x.
- In context, slope includes units such as dollars per month.
- Constant slope is the fingerprint of a linear function.



Always put the change in output over the matching change in input.

Practice

1. Find the slope through $(2, 5)$ and $(6, 13)$. _____

2. Find the slope through $(-3, 4)$ and $(1, -8)$. _____

3. The output changes from 10 to 22 while the input changes from 2 to 8. Find the rate of change.

4. Find the slope from the table: $x : 0, 2, 4$ and $y : 7, 3, -1$.

5. What is the slope of $y = 5$? What is the slope of $x = -2$?

6. A subscription costs $\$45$ for 3 months and $\$75$ for 5 months. Find and interpret the slope.

ANSWER KEY

Answer Key & Explanations

Use the answers to check your work, then read the explanations to learn the method.

How to review

First compare your final answer. If it does not match, read the explanation slowly and redo the problem beside it. The goal is to understand the move that gets you from the question to the final answer.

Week 1 Day 1: The Real Number System and Properties

Answers

1. integer, rational, real
2. rational
3. C
4. distributive property
5. $10y + 7$
6. True

Explanations

1. First simplify the radical: $-\sqrt{49} = -7$. Since -7 is an integer, it is also rational and real, but it is not whole or natural.

2. Use the quotient rule for radicals: $\frac{\sqrt{18}}{\sqrt{2}} = \sqrt{9} = 3$. The result is an integer, so it is rational.

3. $\sqrt{50} = 5\sqrt{2}$, and $\sqrt{2}$ is irrational. The decimal, fraction, and $\sqrt{121} = 11$ are all rational.

4. The factor 4 is multiplied by both terms inside the parentheses. That is exactly the distributive property.

5. Combine like terms: $6y + 4y = 10y$ and $9 - 2 = 7$. The variable term and constant term are not like terms, so the simplified expression is $10y + 7$.

6. If the sum were rational, subtracting the rational addend would make the irrational number rational, which is impossible. So rational plus irrational stays irrational.

Week 3 Day 1: Rate of Change and Slope

Answers

1. 2
2. -3
3. 2
4. -2
5. 0; undefined
6. 15 dollars per month

Explanations

1. Use $\frac{13-5}{6-2} = \frac{8}{4} = 2$. The line rises 2 units for each 1 unit to the right.

2. Compute $\frac{-8-4}{1-(-3)} = \frac{-12}{4} = -3$. The negative slope means the line falls from left to right.

3. The change in output is $22 - 10 = 12$, and the change in input is $8 - 2 = 6$. The rate of change is $12/6 = 2$.

4. When x increases by 2, y decreases by 4. The slope is $\frac{-4}{2} = -2$.

5. The graph $y = 5$ is horizontal, so its slope is 0. The graph $x = -2$ is vertical, so its slope is undefined because the run is 0.

6. The cost changes by \$$30$ while time changes by 2 months. The slope is $30/2 = 15$, meaning the cost increases by \$$15$ each month.

THANK YOU

Enjoyed This Preview?

Get the Full Book!

This preview shows just a small sample of what's inside.
The complete book includes:

- All chapters and topics
- Hundreds of practice problems
- Complete answer key with explanations
- Colorful visuals and step-by-step examples
- Reference sheets and progress trackers

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