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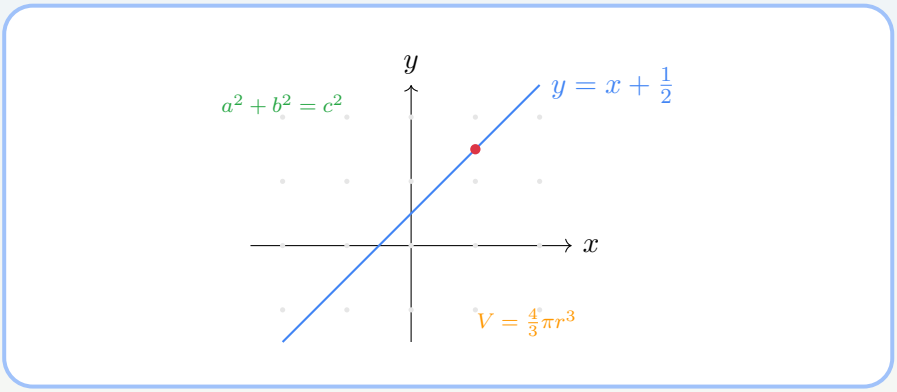
ALGEBRA I
MADE RIDICULOUSLY SIMPLE

THE ULTIMATE STUDY GUIDE TO ACE ALGEBRA I

California Algebra I

Made Ridiculously Simple

Comprehensive Practice, Challenging Exercises, and Strategic Guidance for Complete Test-Day Confidence



Reza Nazari

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A-CED	Create equations that describe numbers or relationships
A-CED.1	Create equations and inequalities in one variable including ones with absolute value and use them to solve problems.
A-CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A-CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.
A-CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

A-REI

This section is about solving with reasons: equations, inequalities, and systems are connected to their tables, graphs, and real solution sets.

A-REI	Understand solving as a reasoning process and solve equations and inequalities
A-REI.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A-REI.4	Solve quadratic equations in one variable.
A-REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
A-REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
A-REI.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

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A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A-REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

A-REI.3.1 Solve one-variable equations and inequalities involving absolute value, graphing the solutions and interpreting them in context.

A-REI.4

This section is about solving with reasons: equations, inequalities, and systems are connected to their tables, graphs, and real solution sets.

A-REI.4.a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

A-REI.4.b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.

A-SSE

This section is about looking inside an expression: what each part means, how the pieces work together, and when an equivalent form makes the problem easier.

A-SSE	Interpret the structure of expressions and write expressions in equivalent forms
A-SSE.1	Interpret expressions that represent a quantity in terms of its context.
A-SSE.2	Use the structure of an expression to identify ways to rewrite it.
A-SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A-SSE.1

This section is about looking inside an expression: what each part means, how the pieces work together, and when an equivalent form makes the problem easier.

A-SSE.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.
A-SSE.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.

A-SSE.3

This section is about looking inside an expression: what each part means, how the pieces work together, and when an equivalent form makes the problem easier.

A-SSE.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.
A-SSE.3.b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
A-SSE.3.c	Use the properties of exponents to transform expressions for exponential functions.

F-BF

Here, students build functions from patterns and contexts, combine simple rules, and connect changes in a formula to changes in the graph.

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CHAPTER

1

Foundations of Algebra

1 Variables, Expressions, and Properties — A-SSE.1.a, A-SSE.1.b

2 Order of Operations and Evaluating Expressions — A-SSE.1.a, A-SSE.2

3 Simplifying Algebraic Expressions — A-SSE.2

4 Introduction to Equations and Solutions — A-REI.1, A-CED.1

5 Personal Financial Literacy — N-Q.1, N-Q.2, N-Q.3

1.1 Variables, Expressions, and Properties

A-SSE.1.a | A-SSE.1.b

In this section, you will learn the building blocks of algebra. Every algebraic expression is made up of variables, coefficients, constants, and terms — and once you know what each piece does, reading and writing expressions becomes much easier. You will also explore the key properties of real numbers — commutative, associative, distributive, identity, and inverse — that let you rearrange and simplify expressions with confidence.

Key Concepts & Quick Review

Parts of an Expression: A **variable** is a letter that stands for an unknown value (e.g. x, n). A **coefficient** is the number multiplied by a variable (7 in $7x$). A **constant** is a number on its own ($+5$ in $7x+5$). A **term** is a single piece of an expression separated by $+$ or $-$ signs. For example, $3x^2-2x+9$ has three terms: $3x^2$, $-2x$, and 9.

Properties of Real Numbers:

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

Associative: $(a+b)+c=a+(b+c)\,,\quad (ab)c=a(bc)$

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

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

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

Examples

① Identify the coefficient, variable, and constant in the expression $4x+9$. Then name the property used to rewrite $4x+9$ as $9+4x$.

The expression $4x+9$ has two terms. In the first term, 4 is the **coefficient** and x is the **variable**. The second term, 9, is a **constant** because it has no variable. Swapping the two terms uses the **Commutative Property of Addition**: $a+b=b+a$.

Answer: *Coefficient* $=4$*; variable* $=x$*; constant* $=9$*; Commutative Property*

② Use the distributive property to expand and simplify $5(2x-3)+4$.

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Distribute the 5 to each term inside the parentheses: $5 \cdot 2x - 5 \cdot 3 + 4 = 10x - 15 + 4$. Now combine the constant terms -15 and $+4$: $10x - 11$.

Answer: $10x - 11$

Practice Problems

Simplify each expression or name the property. Write your answer on the line.

1. $3(x + 4) =$ _____

2. $2(5a - 1) =$ _____

3. $7 + x = x + 7$ uses _____

4. $4 \cdot (3 \cdot y) = (4 \cdot 3) \cdot y$ uses _____

5. $6(2n + 3) =$ _____

6. $-3(4 - 2x) =$ _____

7. $5m + 0 =$ _____

8. $8+(x+2) = (8+x)+2$ uses _____

9. $9(a - 5) + 2 =$ _____

10. $-2(3x + 4) - x =$ _____

11. $4(x + 1) + 3(x - 2) =$ _____

12. $7 \cdot \frac{1}{7} =$ _____

Study Tips

- Remember that the **distributive property** is your main tool for removing parentheses: multiply the outside factor by every term inside.
- "Like terms" share the same variable and the same exponent. $3x$ and $7x$ are like terms, but $3x$ and $3x^2$ are not.
- When an expression looks complicated, label each part first—coefficient, variable, constant—and then decide which property to apply.

Word Problems

13. A movie ticket costs $\$d$ and a bag of popcorn costs \$3 less than the ticket. Write an expression for the total cost of 2 tickets and 2 bags of popcorn. Then simplify using the distributive property. _____

14. Jasmine says $3(x + 5)$ and $3x + 5$ are equivalent expressions because she "moved the parentheses." Are the expressions equivalent? Simplify $3(x + 5)$ and decide whether it equals $3x + 5$. _____

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