



Present

The Adventurous World of Algebra (Part 1)

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I. What is Algebra?

- A. A Little History
- B. Function Terminology
 - 1. relations and variables
 - 2. standard form
 - 3. $f(x)$ notation
 - 4. terms
 - 5. monomials, binomials & trinomials
 - 6. polynomials

II. Functions

- A. Domain and Range
- B. Graphs and the Coordinate Plane
- C. A Practical Example
- D. Inverse Functions
 - 1. inverse graphs & functions
 - 2. vertical line test

III. Linear Equations

- A. Algebraic Properties
 - 1. manipulating

- equations
- 2. identity properties
- 3. commutative properties
- 4. associative properties
- 5. inverse properties
- 6. closure
- 7. distributive property

B. Linear Equations and Slope

- 1. standard form (slope-intercept)
- 2. slope
- 3. point-slope formula
- 4. finding the equation of a line

C. Properties of Linear Graphs

- 1. y-intercept
- 2. slopes in detail

D. Roots

- 1. definition
- 2. x-intercept formula
- 3. applications of roots

Other titles available from *The Standard Deviants*:

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FORMULAS

Constant:

A number with a constant value.

Variable:

A letter with a value that varies.

Monomials:

$$3x^2 \quad 5x \quad 7x^3$$

Binomials:

$$3x^2 + 2 \quad 3x^2 + 2 \quad x + y$$

Trinomials:

$$3x^2 + 2x^2 + 2 \quad x^2 + 2x + 1$$

Additive Identity:

Adding 0 to any number leaves that number unchanged.

$$3 + 0 = 3 \quad 7x + 0 = 7x$$

Multiplicative Identity:

Multiplying any number by 1 leaves that number unchanged.

$$3 \cdot 1 = 3 \quad (5 + 7x) \cdot 1 = 5 + 7x$$

Commutative Property for Addition:

The order of addition does not matter.

$$3 + 4 = 4 + 3 \quad 3x + 2 = 2 + 3x$$

Commutative Property for Multiplication:

The order of multiplication does not matter.

$$3 \cdot 4 = 4 \cdot 3 \quad 3x(x + 2) = (x + 2)3x$$

Associative Property for Addition:

Grouping in addition does not matter.

$$3 + (4 + 5) = (3 + 4) + 5 \quad 3x + (5 - 6y) = (3x + 5) - 6y$$

Associative Property for Multiplication:

Grouping in multiplication does not matter.

$$3 \cdot (4 \cdot 5) = (3 \cdot 4) \cdot 5 \quad 3(7x) = (3 \cdot 7)x$$

Additive Inverse Property:

Every number has an opposite and opposites add to 0.

$$3 + (-3) = 0$$

Multiplicative Inverse Property:

Every number (except 0) has a reciprocal and reciprocals multiply to 1.

$$3 \cdot \frac{1}{3} = 1$$

Closure Property:

Addition and multiplication are defined for all numbers.

Distributive Property:

If you multiply the sum of two numbers by a third number, it is the same as multiplying each number by the third number and adding.

$$3 \cdot (2 + 4) = 3 \cdot 2 + 3 \cdot 4 \quad 3 \cdot (x + 7) = 3x + 3 \cdot 7$$

Slope Intercept Formula:

$$y = mx + b$$

Slope (m):

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

Point-slope Formula:

$$y - y_1 = m(x - x_1)$$

X-intercept Formula for $y = mx + b$:

$$x = \frac{-b}{m}$$
