9.2: Factoring Using the Distributive Property [Algebra 1(X)]

HCPS III

- **Standard 10:** Patterns, Functions, and Algebra: SYMBOLIC REPRESENTATION: Use symbolic forms to represent, model, and analyze mathematical situations.
- ***Benchmark MA.AI.10.6:*** Factor first- and second-degree binomials and trinomials in one or two variables.
- ***Benchmark MA.AI.10.7:*** Solve quadratic equations in one variable algebraically, graphically, or by using graphing technology.

Goal(s):

- Factor polynomials using the Distributive Property.
- Solve quadratic equations of the form $ax^2 + bx = 0$.

Factor by Using the Distributive Property

Factoring a polynomial is to find its completely factored form.

e.g., $4a(3a + 4)$ $12a^2 + 16a$

Example 1: Using the Distributive Property

Use the Distributive Property to factor each polynomial.

a.) $12x^2 + 16x$ **b.)** $81r + 48rs$

c.) $18cd^2 + 12c^2d + 9cd$ **d.)** $3p^2q^2 + 6pq + p$

Factoring by Grouping

Factoring by grouping is used to factor polynomials that do not hall the same GCF. This is primarily used to factor polynomials with **four** terms.

Example 2: Factoring Using Grouping

Factor each expression.

a.) $4ab + 8b + 3a + 6$

b.) $2s^2 + 2s + 3s + 3$

Example 3: Using the Additive Inverse Property

Find the prime factorization of each number.

a.) $35x - 5xy + 3y - 21$

b.) $9x^2 + 6x - 3xy - 2y$

Solve Equations by Factoring

Zero Product Property:

- If the product of two factors is zero, then at least one of the factors must equal zero.

e.g., $5(0) = 0$ $2x = 0$ $xy = 0$

Example 4: Solving an Equation

Solve each equation.

a.) $(d - 5)(3d + 4) = 0$ **b.)** $(a - 9)(2a + 1) = 0$

Example 5: Solve an Equation by Factoring

Solve each equation.

a.) $5m = 3m^2$

b.) $2x^2 = 3x$

c.) $6y^2 - 4y + 3y - 2 = 0$