Name _____ Class _____ Date _____

Reteaching 9-5

Factoring to Solve Quadratic Equations

OBJECTIVE: Solving quadratic equations by factoring

MATERIALS: None

The Zero-Product Property can be used when factoring quadratic equations. It states that if the product of two numbers equals zero, then one of its factors is zero. For example, if $(x - 2)(x + 1) = 0$, then either $(x - 2) = 0$ or $(x + 1) = 0$. This property allows you to solve a quadratic equation.

Example

Solve $2x^2 - x = 3$ by factoring.

$$2x^2 - x = 3$$

$$2x^2 - x - 3 = 0 \quad \longleftarrow \textbf{Subtract 3 from each side.}$$

$$(2x - 3)(x + 1) = 0 \quad \longleftarrow \textbf{Factor } 2x^2 - x - 3.$$

$$2x - 3 = 0 \text{ or } x + 1 = 0 \quad \longleftarrow \textbf{Use the Zero Product Property.}$$

$$2x = 3 \text{ or } x = -1 \quad \longleftarrow \textbf{Solve for } x.$$

$$x = \frac{3}{2} \text{ or } x = -1$$

The solutions are $\frac{3}{2}$ and -1.

Check

Substitute $\frac{3}{2}$ for x.

$$\left(2\left(\frac{3}{2}\right) - 3\right)\left(\frac{3}{2} + 1\right) \stackrel{?}{=} 0$$

$$(3 - 3)\left(\frac{5}{2}\right) \stackrel{?}{=} 0$$

$$(0)\left(\frac{5}{2}\right) = 0 \checkmark$$

Substitute -1 for x.

$$(2(-1) - 3)(-1 + 1) \stackrel{?}{=} 0$$

$$(-2 - 3)(0) \stackrel{?}{=} 0$$

$$(-5)(0) = 0 \checkmark$$

Exercises

Solve by factoring.

1. $x^2 + 7x + 10 = 0$

2. $x^2 - x = 12$

3. $x^2 - 5x + 6 = 0$

4. $x^2 - 6x = -8$

5. $2x^2 + 5x + 3 = 0$

6. $3x^2 + 2x - 8 = 0$

7. $x^2 - 3x - 28 = 0$

8. $2x^2 - x - 10 = 0$

9. $6x^2 + 2x = 4$

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