

# Solving Quadratics by Factoring

Key

## Solving Quadratics by Factoring: Use the Zero Product Property

1. If  $a \cdot b = 0$  then either  $a = 0$  or  $b = 0$

This is also true of products in the following form:

2. If  $(x - a)(x - b) = 0$ , then either  $(x - a) = 0$  or  $(x - b) = 0$

*This means that one side of the quadratic equation must equal zero!*

Examples: Solve the following Quadratic equations by factoring.

1.  $x^2 + 7x + 12 = 0$

$$(x+4)(x+3) = 0$$

$$(x+4) = 0 \text{ or } (x+3) = 0$$

$$x = -4 \text{ or } x = -3$$

2.  $x^2 - 25 = 0$

$$(x+5)(x-5) = 0$$

$$x+5 = 0 \text{ or } x-5 = 0$$

$$x = -5 \text{ or } x = 5$$

3.  $2x^2 + 4x - 16 = 0$

$$2(x^2 + 2x - 8) = 0$$

$$2(x+4)(x-2) = 0$$

$$2 \neq 0 \text{ or } x+4 = 0 \text{ or } x-2 = 0$$

$$x = -4$$

$$x - 2 = 0$$

$$x = 2$$

4.  $x^2 + 2x - 7 = -4$

$$x^2 + 2x - 3 = 0$$

$$(x+3)(x-1) = 0$$

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

5.  $6x^2 - x - 12 = 0$

$$(3x+4)(2x-3) = 0$$

$$(3x+4) = 0 \text{ or } (2x-3) = 0$$

$$3x+4 = 0 \text{ or } 2x-3 = 0$$

$$3x = -4 \text{ or } 2x = 3$$

$$x = -\frac{4}{3} \text{ or } x = \frac{3}{2}$$

6.  $(4x - 7)(2x + 5) = 0$

$$4x - 7 = 0 \text{ or } 2x + 5 = 0$$

$$4x = 7 \text{ or } 2x = -5$$

$$x = \frac{7}{4} \text{ or } x = -\frac{5}{2}$$

7.  $6x^2 + x + 8 = 10$

$$6x^2 + x - 2 = 0$$

$$(3x+2)(2x-1) = 0$$

$$3x+2 = 0 \text{ or } 2x-1 = 0$$

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

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

8.  $3x^2 + 15x + 18 = 0$

$$3(x^2 + 5x + 6) = 0$$

$$3(x+2)(x+3) = 0$$

$$3 \neq 0 \text{ or } x+2 = 0 \text{ or } x+3 = 0$$

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

9.  $5x^2 + 2x = 0$

$$x(5x+2) = 0$$

$$x = 0 \text{ or } 5x+2 = 0$$

$$x = 0 \text{ or } 5x = -2$$

$$x = 0 \text{ or } x = -\frac{2}{5}$$