

# Solving Quadratics by Factoring

## Zero-Product Property

If  $(a)(b)=0$ , then  $a=0$  or  $b=0$ .

\* Before applying the zero product property, the equation must be fully factored.

\* The zero product property requires the equation to be set equal to zero. [Rearranging may be necessary]

### Examples:

$$\textcircled{1} \begin{array}{r} x^2 + 18 = 9x \\ -9x \quad -9x \end{array}$$

$$\begin{array}{l} x^2 - 9x + 18 = 0 \\ (x-3)(x-6) = 0 \end{array}$$

$$\begin{array}{l} (x-3) = 0 \quad (x-6) = 0 \\ +3 \quad +3 \quad +6 \quad +6 \end{array}$$

$$\boxed{x=3} \quad \boxed{x=6}$$

$$\textcircled{2} \begin{array}{r} 2x^2 + 6x = -4 \\ +4 \quad +4 \end{array}$$

$$\begin{array}{l} 2x^2 + 6x + 4 = 0 \\ 2(x^2 + 3x + 2) = 0 \end{array}$$

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

$$x+2 = 0 \quad x+1 = 0$$

$$\begin{array}{l} -2 \quad -2 \quad -1 \quad -1 \\ \boxed{x=-2} \quad \boxed{x=-1} \end{array}$$

Solutions

### Example 3

$$4x^2 + 3x = 0$$

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

$x = 0$	$4x + 3 = 0$
	$\quad -3 \quad -3$
	$\frac{4x}{4} = \frac{-3}{4}$

$x = -3/4$
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## STEPS

① Set equal to zero!! (Rearranging)

② Factor!! 😊

③ Set factors equal to zero!

④ Solve for x.  
"Solution"

### Ex 4

$$2x^2 - 11x + 14 = 2$$

$$2x^2 - 11x + 12 = 0$$

$$2x^2 - 8x - 3x + 12 = 0$$

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

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

$$x-4 = 0$$

$$+4 \quad +4$$

$x = 4$
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$$2x-3 = 0$$

$$+3 \quad +3$$

$$\frac{2x}{2} = \frac{3}{2}$$

$$x = 3/2$$

$+(-11)$	24
$2 \cdot 12$	24
$-8 + -3$	-11