

◦ **6-8 Solving Equations by Factoring**

Key Questions:

If $3a = 0$, does $a = 0$?

If $3a = 9$, Can $a = 0$?

If $cd = 0$, can $c = 0$?

Solve.

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

$x - 2 = 0$ $+2 \quad +2$ $x = 2$	$x - 3 = 0$ $+3 \quad +3$ $x = 3$
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Check: $x=2$

$$(2-2)(2-3) = 0$$
$$0(-1) = 0$$
$$0 = 0 \checkmark$$

Check

$$x=5$$
$$3(5-5)5 = 0$$
$$3(0)5 = 0$$
$$0 = 0 \checkmark$$

$$3(x - 5)x = 0$$

$x - 5 = 0$ $+5 \quad +5$ $x = 5$	$x = 0$
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$$x=0$$
$$3(0-5)0 = 0$$
$$3(-5)0 = 0$$
$$0 = 0 \checkmark$$

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

$x - 2 = 0$ $+2 \quad +2$ $x = 2$	$x - 3 = 0$ $+3 \quad +3$ $x = 3$	$x - 4 = 0$ $+4 \quad +4$ $x = 4$
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Solve. (You must factor first)

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

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

$$\begin{array}{r} x+3=0 \\ -3 \quad -3 \\ \hline \end{array}$$

$$\boxed{x = -3}$$

$$\begin{array}{r} x+4=0 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\boxed{x = -4}$$

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

$$\begin{array}{r} +3x \quad +3x \\ \hline \end{array}$$

$$\begin{array}{r} x^2 + 3x + 2 \\ +2 \quad +2 \\ \hline \end{array}$$

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

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

$$\begin{array}{r} x+1=0 \\ -1 \quad -1 \\ \hline \end{array} \quad \begin{array}{r} x+2=0 \\ -2 \quad -2 \\ \hline \end{array}$$

$$\boxed{x = -1} \quad \boxed{x = -2}$$

$$x^2 + 10x + 25 = 0$$

$$9x^2 - 4 = 0$$

$$(x+5)(x+5) = 0 \quad (3x+2)(x-2) = 0$$

$$\begin{array}{l|l} x+5 \neq 0 & x+5 = 0 \\ -5 & -5 \\ \hline x = -5 & x = -5 \end{array}$$

$$\begin{array}{l|l} 3x+2 \neq 0 & 3x-2 \neq 0 \\ -2 & +2 \\ \hline 3x = -2 & 3x = 2 \\ \frac{3x}{3} = \frac{-2}{3} & \frac{3x}{3} = \frac{2}{3} \\ x = -\frac{2}{3} & x = \frac{2}{3} \end{array}$$