

Name

# 9.5 Solve Quadratic Equations by Completing the Square

Alg I

I can solve quadratic equations by completing the square.

Completing the Square:  $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$

Example 1:

1)  $x^2 + 8x + c$       $c = \left(\frac{8}{2}\right)^2 = 4^2 = \underline{16}$

$$\begin{array}{l} x^2 + 8x + 16 \\ \boxed{(x+4)^2} \end{array}$$

2)  $x^2 - 12x + c$       $c = \left(\frac{-12}{2}\right)^2 = (-6)^2 = \underline{36}$

$$\begin{array}{l} x^2 - 12x + 36 \\ \boxed{(x-6)^2} \end{array}$$

3)  $x^2 + 3x + c$       $c = \left(\frac{3}{2}\right)^2 = \underline{\frac{9}{4}}$

$$\begin{array}{l} x^2 + 3x + \frac{9}{4} \\ \boxed{\left(x + \frac{3}{2}\right)^2} \end{array}$$

Example 2:

$$c = \left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$$

4)  $x^2 - 2x = 3$

$$x^2 - 2x + 1 = 3 + 1$$

$$\sqrt{(x-1)^2} = \sqrt{4}$$

$$x - 1 = \pm 2$$

$$x - 1 = 2 \quad | \quad x - 1 = -2$$

$$+1 +1 \quad | \quad +1 +1$$

$$\boxed{x=3} \quad | \quad \boxed{x=-1}$$

Ch. 9  
Quiz

Name

# 9.5 Solve Quadratic Equations by Completing the Square

Alg I

I can solve quadratic equations by completing the square.

## Example 3:

$$5) m^2 + 10m = -8$$

$$c = \left(\frac{10}{2}\right)^2 = 5^2 = 25$$

$$m^2 + 10m + 25 = -8 + 25$$

$$\sqrt{(m+5)^2} = \sqrt{17}$$

$$m+5 = \pm 4.1$$

$$m+5 = 4.1 \quad | \quad m+5 = -4.1$$

$$\begin{array}{cc|cc} -5 & -5 & -5 & -5 \end{array}$$

$$\boxed{m = -0.9} \quad | \quad \boxed{m = -9.1}$$

$$\begin{array}{r} \sqrt{17} \\ \sqrt{16} \quad \sqrt{1} \\ \hline 4 \quad 1 \\ \hline 5 \end{array}$$

Ch. 9 Quiz

\* Complete Skills

$$6) 3g^2 - 24g + 27 = 0$$

$$\begin{array}{cc} -27 & -27 \end{array}$$

$$c = \left(\frac{-8}{2}\right)^2 = \frac{64}{4}$$

$$\frac{3g^2 - 24g = -27}{3} \quad \frac{-27}{3}$$

$$g^2 - 8g = -9$$

$$g^2 - 8g + \frac{64}{4} = -9 + \frac{64}{4}$$

$$\sqrt{\left(g - \frac{8}{2}\right)^2} = \sqrt{7}$$

$$g - \frac{8}{2} = \pm 2.65$$

$$g - 4 = 2.65 \quad | \quad g - 4 = -2.65$$

$$\begin{array}{cc|cc} +4 & +4 & +4 & +4 \end{array}$$

$$\boxed{g = 6.65} \quad | \quad \boxed{g = 1.35}$$

$$\begin{array}{r} \sqrt{7} \\ \sqrt{4} \quad \sqrt{3} \\ \hline 2 \quad 3 \end{array}$$

Practice, pg. 608, #