Name: _____   Date: _____

Learning Goal 4.2	Given a quadratic equation, find the values of solution(s) by factoring, completing the square or using the quadratic formula.

Solve the following equations by completing the square.

a. $p^2 + 14\,p - 38 = 0$

$$\left(\frac{14}{2}\right)^2 = (7)^2 = 49$$

$(p^2 + 14\,p + 49 - 49) - 38 = 0$
$(p^2 + 14\,p + 49) - 49 - 38 = 0$
$(p + 7)^2 - 49 - 38 = 0$
$(p + 7)^2 - 87 = 0$

CHECK $\begin{array}{l} a > 0 \\ q < 0 \end{array}$ 2
Solutions

$(p + 7)^2 = 87$
$p + 7 = \pm\sqrt{87}$
$p = -7 \pm \sqrt{87}$

b. $r^2 - 4r - 91 = 7$

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

$(r^2 - 4r + 4 - 4) - 98 = 0$
$(r^2 - 4r + 4) - 4 - 98 = 0$
$(r - 2)^2 - 4 - 98 = 0$
$(r - 2)^2 - 102 = 0$

CHECK $\begin{array}{l} a > 0 \\ q < 0 \end{array}$ 2
Solutions

$(r - 2)^2 = 102$
$r - 2 = \pm\sqrt{102}$
$r = 2 \pm \sqrt{102}$

c. $4x^2 + 8x - 9 = 0$

$\qquad 4(x^2 + 2x) - 9 = 0$

$\qquad \left(\dfrac{2}{2}\right)^2 = (1)^2 = 1$

$\qquad 4(x^2 + 2x + 1 - 1) - 9 = 0$

$\qquad 4(x^2 + 2x + 1) - 4 - 9 = 0$

$\qquad 4(x + 1)^2 - 4 - 9 = 0$

$\qquad 4(x + 1)^2 - 13 = 0$

CHECK $\qquad \begin{array}{l} a > 0 \\ q < 0 \end{array} \qquad \begin{array}{l} 2 \\ \text{Solutions} \end{array}$

$\qquad 4(x + 1)^2 = 13$

$\qquad (x + 1)^2 = \dfrac{13}{4}$

$\qquad x + 1 = \pm\sqrt{\dfrac{13}{4}} = \pm\dfrac{\sqrt{13}}{2}$

$\qquad x = -1 \pm \dfrac{\sqrt{13}}{2}$

$\qquad x = \dfrac{-2 \pm \sqrt{13}}{2}$

d. $-3x^2 - 18x - 35 = 0$

$\qquad -3(x^2 + 6x) - 35 = 0$

$\qquad \left(\dfrac{6}{2}\right)^2 = (3)^2 = 9$

$\qquad -3(x^2 + 6x + 9 - 9) - 35 = 0$

$\qquad -3(x^2 + 6x + 9) + 27 - 35 = 0$

$\qquad -3(x + 3)^2 + 27 - 35 = 0$

$\qquad -3(x + 3)^2 - 8 = 0$

CHECK $\qquad \begin{array}{l} a < 0 \\ q < 0 \end{array} \qquad \begin{array}{l} 0 \\ \text{Solutions} \end{array}$

No **real** solutions