

Sec. 1.7 Complete the Square

Solve Perfect Square Trinomial

$$x^2 + 20x + 100 = 81$$

$$(x + 10)^2 = 81$$

$$\sqrt{(x+10)^2} = \pm\sqrt{81}$$

$$x + 10 = \pm 9$$

$$\begin{array}{r} -10 \\ -10 \end{array}$$

$$\hline x = -10 \pm 9$$

$$-10 + 9 = -1$$

$$-10 - 9 = -19$$

Solve $x^2 - 10x + 1 = 0$

$$\begin{array}{r} -1 \\ -1 \end{array}$$

$(x-5)(x-5)$
 $x^2 - 5x - 5x + 25$

$$x^2 - 10x + 25 = -1 + 25$$

$$(x-5)^2 = 24$$

$$\sqrt{(x-5)^2} = \pm\sqrt{24}$$

$$x - 5 = \pm 2\sqrt{6}$$

$$\begin{array}{r} +5 \\ +5 \end{array}$$

$$\hline x = 5 \pm 2\sqrt{6}$$

$$x^2 + 6x + 4 = 0$$

$$x^2 + 6x + 9 = -4 + 9$$

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

$$\sqrt{(x+3)^2} = \pm\sqrt{5}$$

$$x+3 = \pm\sqrt{5}$$

$$x = -3 \pm \sqrt{5}$$

$$\frac{3x^2}{3} - \frac{36x}{3} + \frac{150}{3} = \frac{0}{3}$$

$$x^2 - 12x + 50 = 0$$

$$x^2 - 12x + 36 = -50 + 36$$

$$(x-6)^2 = -14$$

$$\sqrt{(x-6)^2} = \pm\sqrt{-14}$$

$$x-6 = \pm i\sqrt{14}$$

$$x = 6 \pm i\sqrt{14}$$

$$\sqrt{-1} = i$$

Write in vertex form.

$$y = x^2 + 18x + 95$$

$$y - 95 + 81 = x^2 + 18x + 81$$

$$y - 14 = (x + 9)^2$$

$$y = (x + 9)^2 + 14$$

$$v: (-9, 14)$$

↻
min: 14

$$y = x^2 - 8x + 17$$

$$y - 17 + 16 = x^2 - 8x + 16$$

$$y - 1 = (x - 4)^2$$

$$y = (x - 4)^2 + 1$$

$$v: (4, 1)$$

$$y = -16t^2 + 80t + 2$$

$-\frac{4}{-16} \cdot \frac{25}{4}$

$$y - 2 - 100 = -16t^2 + 80t - 100$$

$$y - 2 - 100 = -16 \left(t^2 - 5t + \frac{25}{4} \right)$$

$$y - 102 = -16 \left(t - \frac{5}{2} \right)^2 + 102$$

$$y = -16 \left(t - \frac{5}{2} \right)^2 + 102$$

$$y = 5x^2 + 10x + 7$$

$$\frac{y - 7 + 5}{-7 + 5} = 5x^2 + 10x + 5$$

$$y - 7 + 5 = 5(x^2 + 2x + 1)$$

$$y - 2 = 5(x + 1)^2$$

$$\frac{y + 2}{+2} = 5(x + 1)^2 + 2$$

$$y = 5(x + 1)^2 + 2$$

$$v: (-1, 2)$$

p. 54 (13-57) e00