Sec. 10.3 Completing the Square

Complete the square by finding the value that makes a perfect-square trinomial when added to the binomial

a. $x^2 - 8x + 16$

$\div 2$, ^{2}

$(x-4)^2$

$(x+a)(x+a) = (x+a)^2$

$x^2 + ax + ax + a^2$

b. $x^2 + 20x + 100$

$(x+10)^2$

$(x+10)(x+10)$

$x^2 + 10x + 10x + 100$

$20x$

c. $x^2 - 12x + 36$

$(x-6)^2$

d. $x^2 + 4x + 4$

$(x+2)^2$

e. $x^2 - 5x + \frac{25}{4}$

$(x-\frac{5}{2})^2$

$-\frac{5}{2} \div 2 = \frac{25}{4}$

Find the vertex of each parabola.

a. $y = x^2 + 3$

v: (0, 3)

Vertex form

$y = a(x-h)^2 + k$

Vertex : (h, k)

b. $y = -x^2 + 2$

v: (0, 2)

c. $y = -x^2 + 6$

v: (0, 6)

d. $y = x^2 - 5$

v: (0, -5)

Rewrite $y = x^2 + 2x + 5$ in the form $y = (x-h)^2 + k$

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

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

$y = (x \underbrace{+1}_{x\,[-h]})^2 + 4$

$[h]$ change keep

V: $(-1, 4)$

b. $y = 6x + 15 + x^2$

$y = x^2 + 6x + 15$

$y = (x^2 + 6x \underline{+9}) + 15 \underline{-9}$

$y = (x+3)^2 + 6$

V: $(-3, 6)$