

Completing the Square

Find C to complete the square. $C = \left(\frac{b}{2}\right)^2$

① $X^2 - 16X + C$

$$C = \left(\frac{b}{2}\right)^2 = \left(\frac{-16}{2}\right)^2 = (-8)^2 = 64$$

$C = 64$

What are the solutions of the equation?

② $X^2 - 14X + 16 = 0$
 $-16 \quad -16$

$C = \left(\frac{b}{2}\right)^2$

$C = \left(\frac{-14}{2}\right)^2$

$C = (-7)^2$

$C = 49$

$$X^2 - 14X + 49 = -16 + 49$$

$$\sqrt{(X-7)^2} = \sqrt{33}$$

$$X-7 = \pm\sqrt{33}$$

$X-7 = \sqrt{33}$

$X-7 = -\sqrt{33}$

$+7 \quad +7$

$+7 \quad +7$

$X = 12.74$

$X = 1.26$

Find the vertex by completing the square.

③ $Y = X^2 + 6X + 8$
 $-8 \quad -8$

$C = \left(\frac{b}{2}\right)^2$

$C = \left(\frac{6}{2}\right)^2$

$C = 3^2$

$C = 9$

$$Y - 8 + 9 = X^2 + 6X + 9$$

$$Y + 1 = (X + 3)^2$$

$-1 \quad -1$

$$Y = (X + 3)^2 - 1$$

Vertex: $(-3, -1)$