

Completing the Square : Vertex form

Ex 3: $y = x^2 + 10x + 8$

$$0 = x^2 + 10x + 8$$

$$+ \boxed{25} - 8 = x^2 + 10x + \boxed{25}$$

$$-17 = (x+5)^2$$

$$0 = (x+5)^2 - 17$$

$$y = (x+5)^2 - 17$$

$$\text{Vertex: } (-5, -17)$$

$$\frac{10}{2} = 5$$
$$5^2 = 25$$

$$\begin{array}{r} 25 \\ 5 \times 5 \\ \hline 10 \end{array}$$

- ✓ ① Set $y = 0$
- ✓ ② Move the constant to the left side
- ✓ ③ Complete the square by dividing the x-term # by 2, then square it
- ✓ ④ Factor
- ✓ ⑤ Move the # on the left back to the right
- ⑥ Vertex form
 $y = (x-h)^2 + k$