

## COMPLETE THE SQUARE

$$y = x^2 + 12x + 30$$

$$y - 30 + \square = x^2 + 12x + \square$$

$$y - 30 + 36 = x^2 + 12x + 36$$

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

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

## SOLVE (find x-int)

$$0 = (x + 6)^2 - 6$$

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

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

$$\pm\sqrt{6} = (x + 6)$$

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

- If the radical can be simplified, do so

$$y = x^2 + 2x - 7$$

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

$$y + 7 + \boxed{1} = x^2 + 2x + \boxed{1}$$

$$y + 8 = (x + 1)^2$$

$$y = (x + 1)^2 - 8$$

$$0 = (x + 1)^2 - 8$$

$$8 = (x + 1)^2$$

$$\pm\sqrt{8} = x + 1$$

$$x = -1 \pm \sqrt{8}$$

$$\boxed{x = -1 \pm 2\sqrt{2}}$$

$$y = x^2 - 20x + 28$$

$$y - 28 = x^2 - 20x$$

$$y - 28 + \boxed{100} = x^2 - 20x + \boxed{100}$$

$$y + 72 = (x - 10)^2$$

$$y = (x - 10)^2 - 72$$

$$0 = (x - 10)^2 - 72$$

$$72 = (x - 10)^2$$

$$\pm\sqrt{72} = x - 10$$

$$x = 10 \pm \sqrt{72}$$

$$\boxed{x = 10 \pm 6\sqrt{2}}$$