

# Completing the Square Day 2 a $\neq 1$

Convert the equation from standard to vertex form.

$$y = 3x^2 + 18x + 7$$

$$\frac{1}{3}y = x^2 + 6x + 2.\bar{3}$$

Divide everything by a so you get  $1x^2$

$$\frac{1}{3}y = (x^2 + 6x + \underline{\quad}) + 2.\bar{3} - \underline{\quad}$$
 Write two blanks: inside+, outside -

$$\frac{1}{3}y = (x^2 + 6x + (3)^2) + 2.\bar{3} - (3)^2$$
 Fill the blanks with  $\left(\frac{b}{2}\right)^2$

$$\frac{1}{3}y = (x^2 + 6x + 9) + 2.\bar{3} - (9)$$
 Square the parenthesis

$$\frac{1}{3}y = (x + 3)^2 - 6.\bar{6}$$
 Factor and simplify

$$y = 3(x + 3)^2 - 20$$
 Multiply the numbers outside the parenthesis by 3.

Convert the equation from standard to vertex form.

$$g(x) = -5x^2 + 50x + 128$$

$$\frac{-1}{5}y = x^2 - 10x - 25.6$$

Divide everything by a so you get  $1x^2$

$$\frac{-1}{5}y = (x^2 - 10x + \underline{\quad}) - 25.6 - \underline{\quad}$$

Write two blanks: inside+, outside -

$$\frac{-1}{5}y = (x^2 - 10x + (-5)^2) - 25.6 - (-5)^2$$

Fill the blanks with  $\left(\frac{b}{2}\right)^2$

$$\frac{-1}{5}y = (x^2 - 10x + 25) - 25.6 - (25)$$

Square the parenthesis

$$\frac{-1}{5}y = (x - 5)^2 - 50.6$$

Factor and simplify

$$g(x) = -5(x - 5)^2 + 253$$

Multiply the numbers outside the parenthesis by -5.

Convert the equation from standard to vertex form.

$$h(x) = -2x^2 + 9x - 13$$

$$\frac{-1}{2}y = x^2 - 4.5x + 6.5$$

Divide everything by a so you get  $1x^2$

$$\frac{-1}{2}y = (x^2 - 4.5x + \underline{\quad}) + 6.5 - \underline{\quad}$$

Write two blanks: inside+, outside -

$$\frac{-1}{2}y = (x^2 - 4.5x + (2.25)^2) + 6.5 - (2.25)^2$$

Fill the blanks with  $\left(\frac{b}{2}\right)^2$

$$\frac{-1}{2}y = (x^2 - 4.5x + 5.0625) + 6.5 - (5.0625)$$

Square the parenthesis

$$\frac{-1}{2}y = (x - 2.25)^2 + 1.4375$$

Factor and simplify

$$h(x) = -2(x - 2.25)^2 - 2.875$$

Multiply the numbers outside the parenthesis by -2.