

Vertex Form  $\rightleftarrows$  Standard Form

Standard  $\rightarrow$  Vertex  $y = a(x-h)^2 + k$

$$y = 2x^2 + 4x - 3$$

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

$$\frac{-b}{2a} = \frac{-4}{2 \cdot 2} = \frac{-4}{4} = -1 \quad (h)$$

$\#$  a is the same

Plug -1 into equation

$$\begin{aligned} y &= 2(-1)^2 + 4(-1) - 3 \\ &= 2(1) - 4 - 3 \\ &= 2 - 4 - 3 \\ &= -5 \quad (k) \end{aligned}$$

$$y = 2(x+1)^2 - 5$$

Vertex  $\rightarrow$  ~~Standard~~ Standard

PEMDAS

$$\begin{aligned} y &= 3(x-3)^2 + 4 \\ &= 3(x-3)(x-3) + 4 \\ &= 3(x^2 - 6x + 9) + 4 \\ &= 3x^2 - 18x + 27 + 4 \end{aligned}$$

$$\begin{aligned} &(x-3)(x-3) \\ &x^2 - 3x - 3x + 9 \end{aligned}$$

$$y = 3x^2 - 18x + 31$$