

Vertex \rightarrow Standard

EX 1)

$$y = (x-2)^2 + 4$$

$$y = (x-2)(x-2) + 4$$

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

$$y = x^2 - 4x + 8$$

EX 2)

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

$$y = 3(x-3)(x-3) + 4$$

$$y = 3(x^2 - 3x - 3x + 9) + 4$$

$$y = 3(x^2 - 6x + 9) + 4$$

$$y = 3x^2 - 18x + 27 + 4$$

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

Write as two binomials being mult.

FOIL

Combine like terms in ()

Distribute "a" value

Combine like terms

Standard \rightarrow Vertex

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

$$x = \frac{-b}{2a} = \frac{-4}{2(2)} = -1$$

vertex: $(-1, -5)$

$\frac{-b}{2a}$ \rightarrow h
Plug in $\frac{-b}{2a}$ \rightarrow k

$$f(-1) = 2(-1)^2 + 4(-1) - 3$$
$$2(1) - 4 - 3$$
$$-5$$

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

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

"a" value is the same from standard

EX) $y = 2x^2 - 4x + 5$

vertex: $(1, 3)$

$$2(1)^2 - 4(1) + 5$$
$$2 - 4 + 5$$
$$2 + 1$$
$$3$$

$$y = 2(x-1)^2 + 3$$