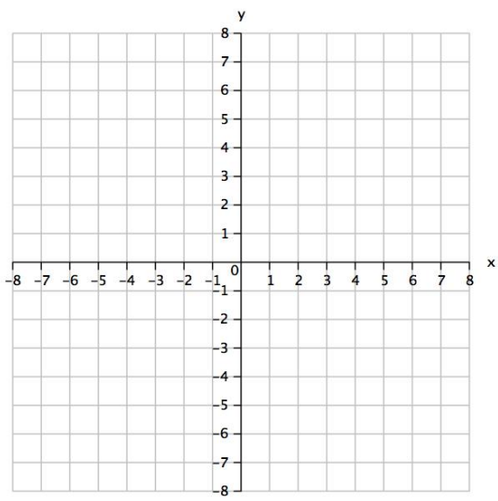
5.3: Graphing Quadratic Functions – Vertex Form

Using the STEP PATTERN to graph QFs:

Graphing a QF in vertex form can be drawn using transformations of the parent graph, $y = x^2$.

i) $y = x^2$ and the step pattern. Complete the TOV for $y = x^2$ and join the points into a smooth curve.



Starting *at the vertex (0, 0)*, you can find other points on the parabola by using the STEP PATTERN.

STEP PATTERN (for $y = x^2$) : Over 1, up 1. Over 1 up 3. Over 1 up 5. Over 1, up 7…etc.

(Hint: think 1, 3, 5, 7, …)

ii) Find the step pattern for the following graphs.

a. $y = 2x^2$

b. $y = -3x^2$

c. $y = 1.5x^2$

STEP PATTERN (for all in the form $y = ax^2$): Think 1a, 3a, 5a, 7a, …

Finding the Vertex in Vertex Form:

Equations in vertex form look like the following. $y = a(x - h)^2 + k$

- "h" is the x value of the vertex
- "k" is the y-value of the vertex
- (h, k) is the vertex

Find the vertex for the following:

a) $y = (x - 4)^2 + 5$ _____

b) $y = 5(x - 1)^2$ _____

c) $y = -8(x + 6)^2 - 3$ _____

d) $y = \frac{1}{4}(x)^2 - 2$ _____