

Graphing Quadratic Functions in Vertex Form

Learning targets:

1. Use the parameters from vertex form to determine:
 - a) the coordinates of the vertex
 - b) axis of symmetry
2. Use the vertex form equation to determine the y -intercept.
3. Graph a quadratic function in vertex form using a minimum of 5 points.

To sketch the graph of a quadratic function

We need to determine a minimum of 5 points:

→ the location of the **vertex**

– We get this from the values of h and k in the equation.

→ the location of the **y -intercept and its reflection across the axis of symmetry**

→ the coordinates of **at least one more point and its reflection across the axis of symmetry** (at least two more points if the y -intercept is too small or too large to fit on the graphing grid given)

Steps for sketching the graph of a quadratic function:

1. Determine the coordinates of the **vertex** using h and k .
 - Plot this point on the grid
 - Sketch in the axis of symmetry as a dotted vertical line running through the vertex
2. Calculate the **y-intercept**
 - Plot this point on the grid, if it fits
 - Plot the reflection of this point on the other side of the axis of symmetry
3. Calculate at least **one more point** using an x -value close to the vertex
 - Plot this point and its reflection on the other side of the axis of symmetry
 - Join all of your points to draw the parabola

Example: Sketch $f(x) = (x - 3)^2 - 8$

Vertex: $(3, -8)$

Axis of symmetry:

$$x = 3$$

y-intercept:

$$\text{let } x = 0$$

$$y = (0 - 3)^2 - 8$$

$$y = 9 - 8$$

$$y = 1$$
$$(0, 1)$$

Additional point(s):

$$(3, -8)$$

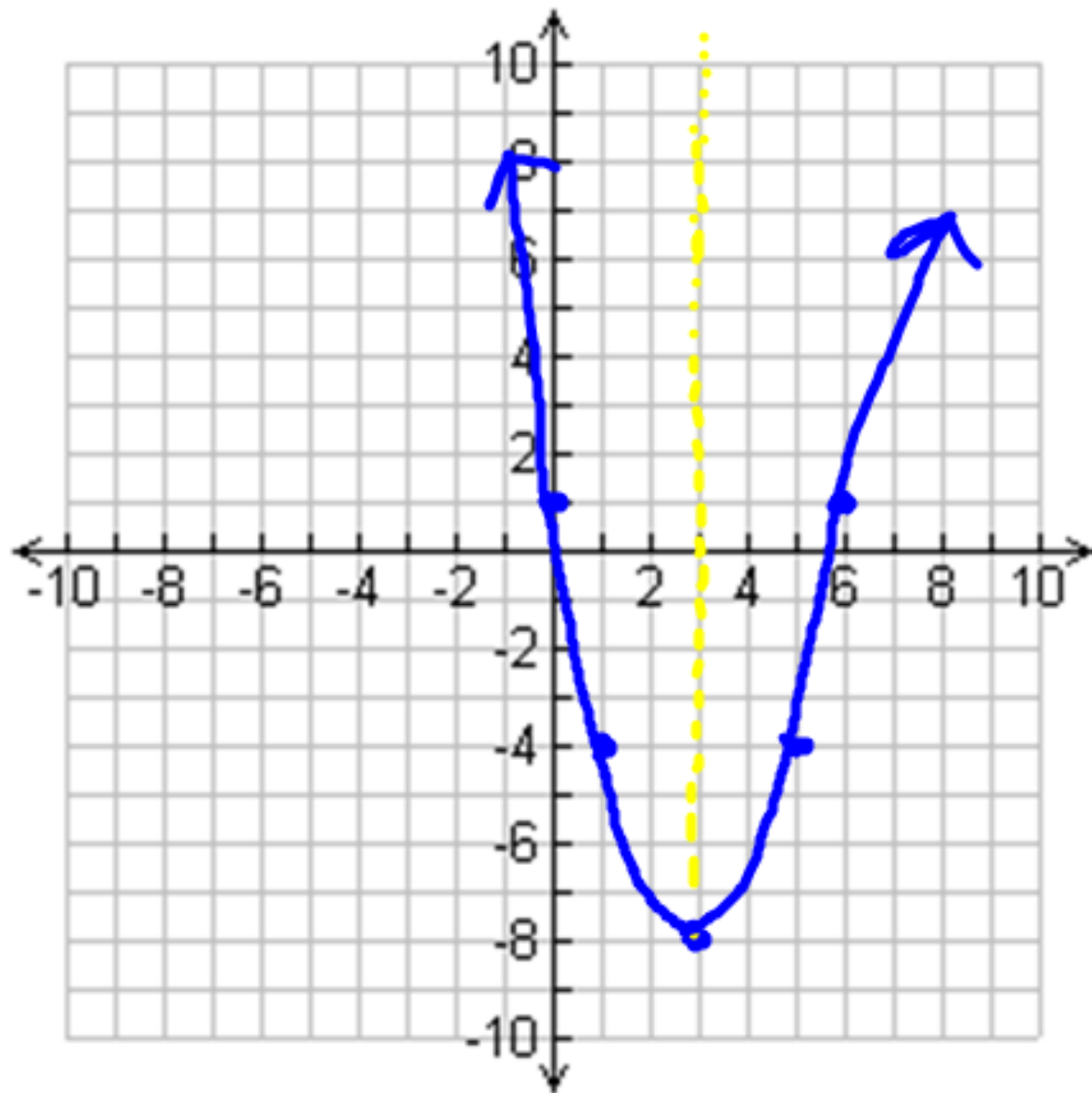
$$(0, 1)$$

$$(6, 1)$$

$$(1, -4)$$

$$(5, -4)$$

x	y
3	-8
0	1
6	1
1	-4
5	-4



Example: Sketch $f(x) = -\frac{1}{2}(x + 4)^2 + 2$

Vertex: $(-4, 2)$

Axis of symmetry:

$$x = -4$$

y-intercept:

$$\text{Let } x = 0$$

$$y = -\frac{1}{2}(0 + 4)^2 + 2$$

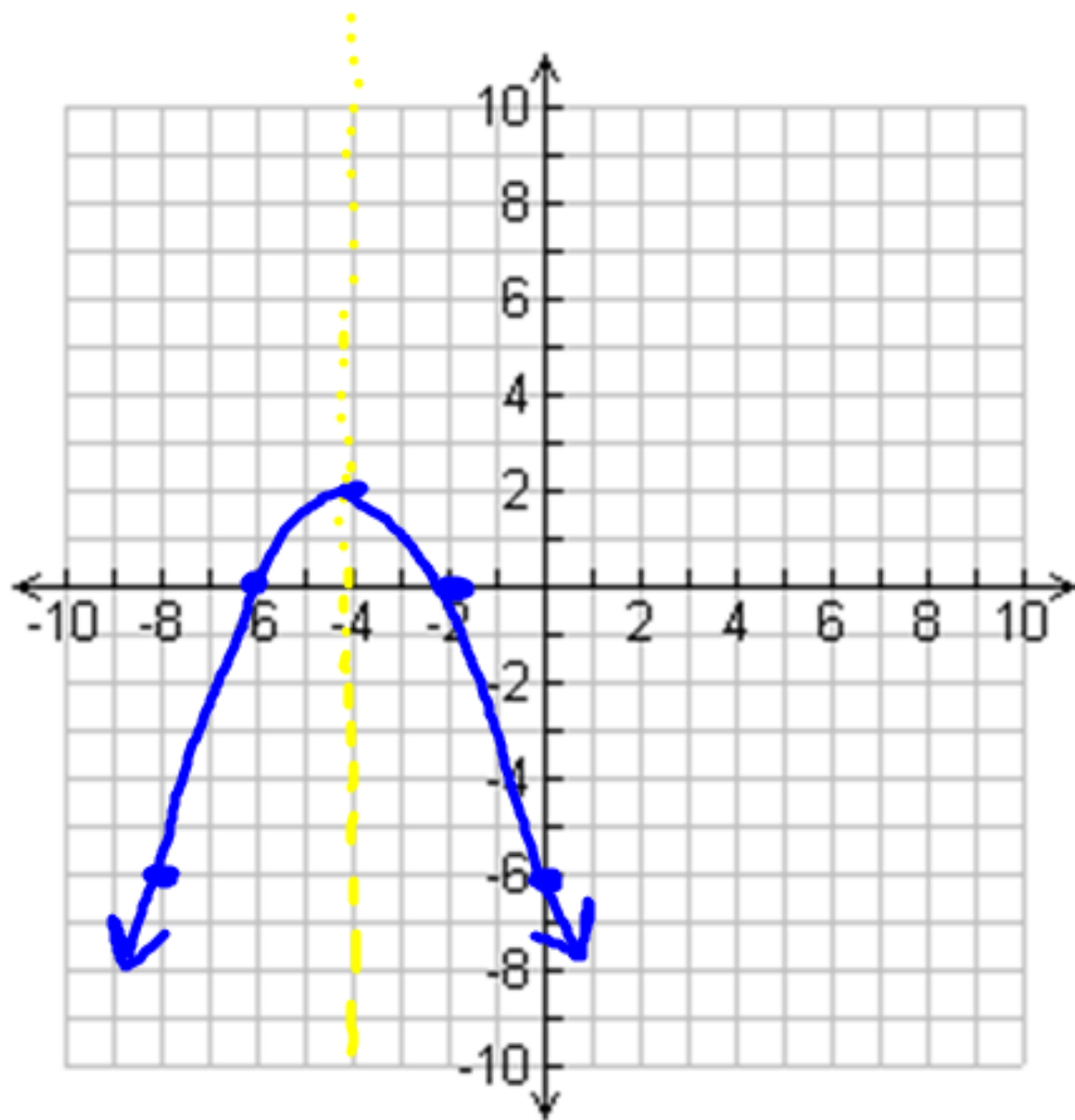
$$y = -\frac{1}{2}(16) + 2$$

$$y = -8 + 2$$

$$y = -6$$

Additional point(s):

x	y
-4	2
0	-6
-8	-6
-2	0
-6	0



Assignment

Handout: #1 – 6