

# Graphing Quadratics

Subject: Algebra 2

Level: High School

Objective: Graphing of Quadratic Equations in  
 $f(x)=ax^2+bx+c$  form

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$$y = ax^2 + bx + c$$

# Instructions

1. Label "a", "b", and "c"

2. Find the Axis of Symmetry  $\rightarrow X = -\frac{b}{2a}$

3. Find the Vertex

4. Find the Y-Intercept

5. Find another point on the same side of the axis of symmetry as the y-intercept. If the vertex is the y-intercept find a second point

6. Mirror the two points over the axis of symmetry and graph the parabola

# Example

$$y = ax^2 + bx + c$$

This is what your final graph should look like

$$f(x) = \frac{1}{4}x^2 + 2x - 3$$

$$a = 1/4 \quad b = 2 \quad c = -3$$

Axis of symmetry

$$x = -4$$

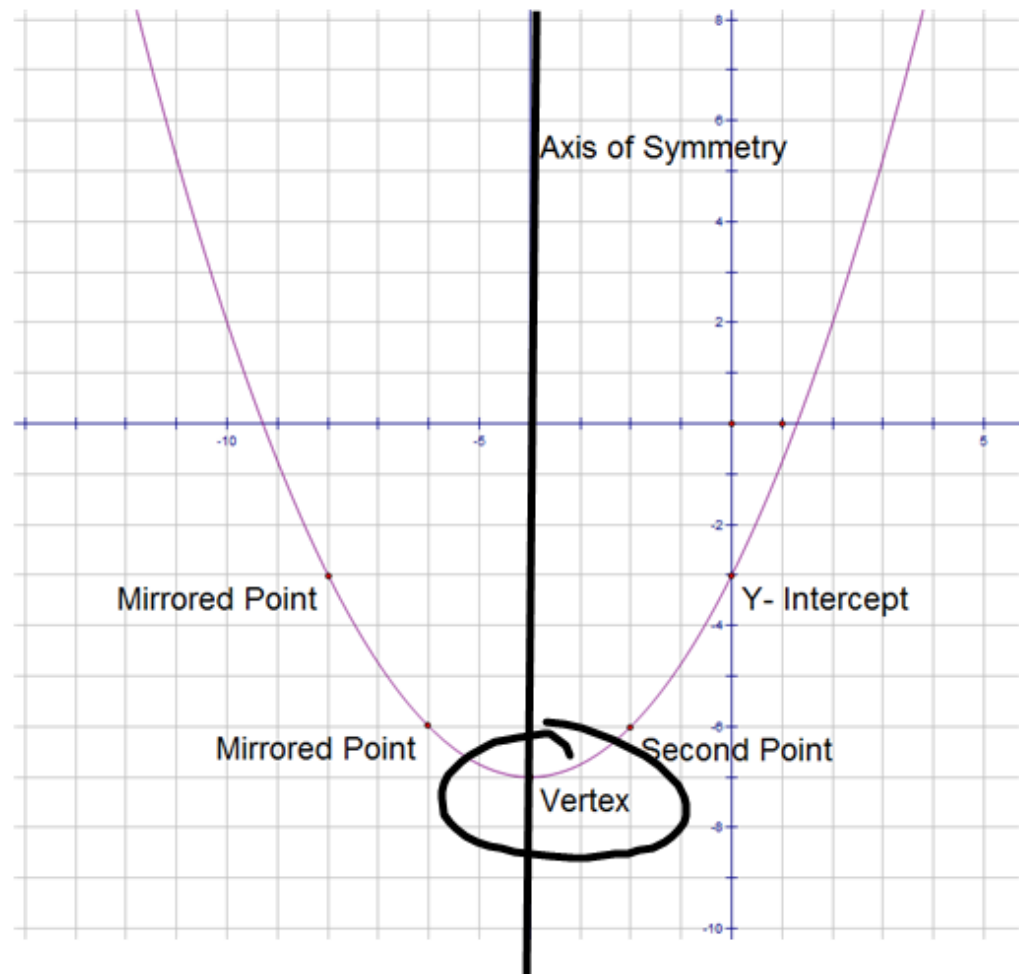
Vertex

$$(-4, -7)$$

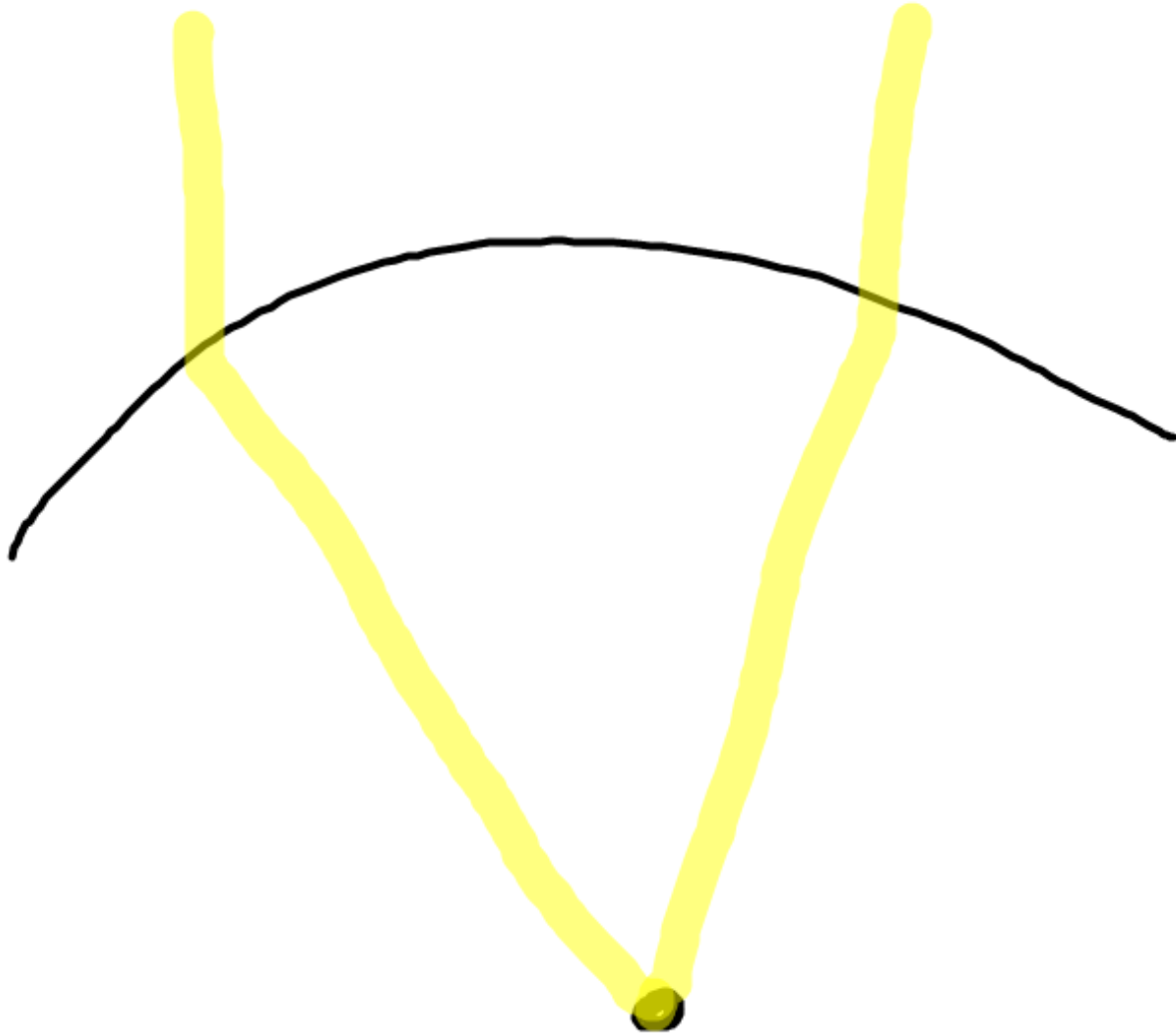
Second Point

$$(-2, -6)$$

$$a = \frac{1}{4} \quad b = 2 \quad c = -3$$



Parabola



Drag the numbers to the correct boxes. When done pop the bubbles to check your answers

$$f(x) = x^2 - 4x + 1$$

$$f(x) = -2x^2 + 5x - 2$$

$$f(x) = 3x^2 + 1$$

$$a = \boxed{1} \quad \text{Bubble}$$

$$a = \boxed{-2} \quad \text{Bubble}$$

$$a = \boxed{3} \quad \text{Bubble}$$

$$b = \boxed{-4} \quad \text{Bubble}$$

$$b = \boxed{5} \quad \text{Bubble}$$

$$b = \boxed{0} \quad \text{Bubble}$$

$$c = \boxed{1} \quad \text{Bubble}$$

$$c = \boxed{-2} \quad \text{Bubble}$$

$$c = \boxed{1} \quad \text{Bubble}$$

1      2      -9      4  
5      -7      7  
3  
6      8      9  
-5      0  
-1      -3      -6      -2      -4      -8

Formula for the Axis of symmetry is

$$x = \frac{-b}{2a}$$

$$f(x) = \frac{1}{4}x^2 + 2x - 3 \quad a = 1/4 \quad b = 2 \quad c = -3$$

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

Find the Axis of symmetry for each of the following graphs

$$f(x) = x^2 - 4x + 1$$

$$a = \boxed{\phantom{00}}$$

$$b = \boxed{\phantom{00}}$$

$$c = \boxed{1}$$

$$f(x) = -2x^2 + 5x - 2$$

$$a = \boxed{\phantom{00}}$$

$$b = \boxed{\phantom{00}}$$

$$c = \boxed{-2}$$

$$f(x) = 3x^2 + 1$$

$$a = \boxed{\phantom{00}}$$

$$b = \boxed{\phantom{00}}$$

$$c = \boxed{1}$$

Drag the numbers to the correct space and then solve the problem

Write your answer in the box

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

$\frac{4}{2}$

$$x = \frac{-5}{2(-2)} = \boxed{\frac{5}{4}}$$

$$x = \frac{-(0)}{2(3)} = \boxed{0}$$

$\frac{0}{6}$

Find the Vertex by using the x-Value from the Axis of symmetry

$$f(x) = \frac{1}{4}x^2 + 2x - 3$$

$$a = 1/4 \quad b = 2 \quad c = -3$$

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

$$y = \frac{1}{4}(-4)^2 + 2(-4) - 3$$

$$f(x) = 1/4(-4)^2 + 2(-4) - 3 \quad y = -7$$

$$f(x) = -7$$

Vertex (-4, -7)

Find the Vertex by using the x-Value from the Axis of symmetry

$$f(x) = x^2 - 4x + 1$$

Axis of  
Symmetry

$$x = \boxed{2}$$

Vertex

$$f(x) = -2x^2 + 5x - 2$$

Axis of  
Symmetry

$$x = \boxed{-5/4}$$

$$-2(-5/4)^2 + 5(-5/4) - 2$$

Vertex

$$f(x) = 3x^2 + 1$$

Axis of  
Symmetry

$$x = \boxed{0}$$

Vertex

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# 20 - 25

find a, b, c

axis of symmetry

vertex

**GRAPHING WITH STANDARD FORM** Graph the quadratic function. Label the vertex and axis of symmetry.

20.  $y = x^2 - 2x - 1$

21.  $y = 2x^2 - 12x + 19$

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

23.  $y = -3x^2 + 5$

24.  $y = \frac{1}{2}x^2 + 4x + 5$

25.  $y = -\frac{1}{6}x^2 - x - 3$