Warm-up:

Directions: Write each decimal as a fraction of integers

1) 0.5 $\qquad \dfrac{1}{2}$

2) $0.\overline{3}$ $\qquad \dfrac{1}{3}$

3) -1.5 $\qquad -\dfrac{3}{2}$

1. A group of students each write a quadratic function in factored form to represent a parabola that opens downward and has zeros at $x = 4$ and $x = -1$.

Maureen 👍

My function is

$k(x) = -(x - 4)(x + 1).$

Tom 👍

My function is

$g(x) = -2(x - 4)(x + 1).$

Tim 👎

My function is

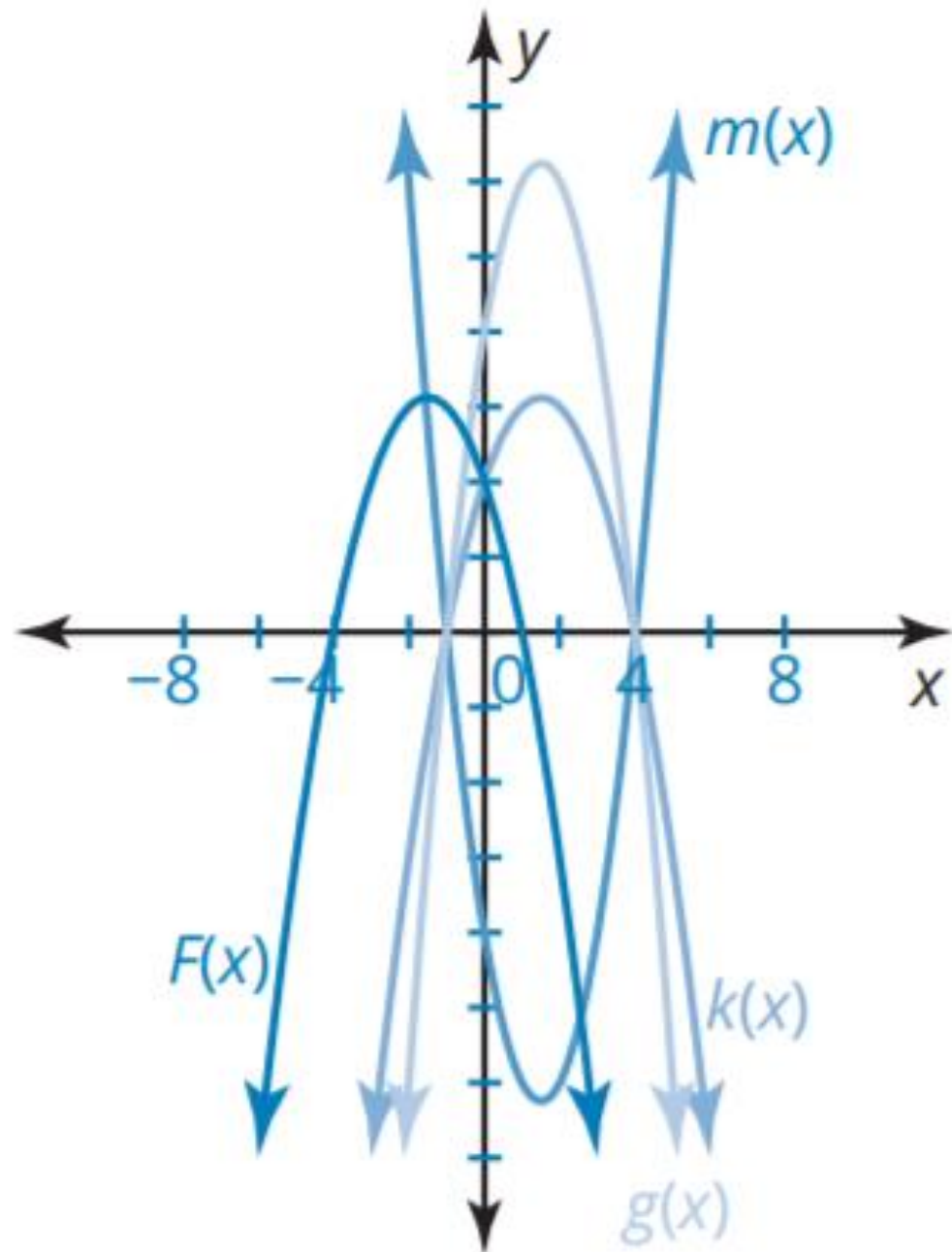$m(x) = 2(x - 4)(x + 1).$

Micheal 👎

MY FUNCTION IS

$F(x) = -(x + 4)(x - 1).$

If given a function $g(x)$ with a zero at $x = 4$, then $g(4) = 0$. This can also be interpreted as an x-intercept at $(4, 0)$.

a. Sketch a graph of each student's function and label key points. What are the similarities among all the graphs? What are the differences among the graphs?

b. What would you tell Tim and Micheal to correct their functions?

c. **How is it possible to have more than one correct function?**

As long as the parabola opens downward and intersects the x-axis at the given points, it can have different maximums and therefore more than one correct function.

d. **How many possible functions can represent the given characteristics? Explain your reasoning.**

There are an infinite number of equations for the function because the coefficient a does not affect the x-intercepts. All possible equations are of the form f(x) = $a(x - 4)(x + 1)$, where a 0.

2. Consider a quadratic function written in factored form,

$$f(x) = a(x - r_1)(x - r_2).$$

a. What does the sign of the a-value tell you about the graph?

The sign of a indicates whether the parabola opens upward (a > 0) or downward (a < 0).

b. What do r_1 and r_2 tell you about the graph?

The variables r_1 and r_2 represent the x-coordinates of the x-intercepts. The x-intercepts are (r_1, 0) and (r_2, 0).

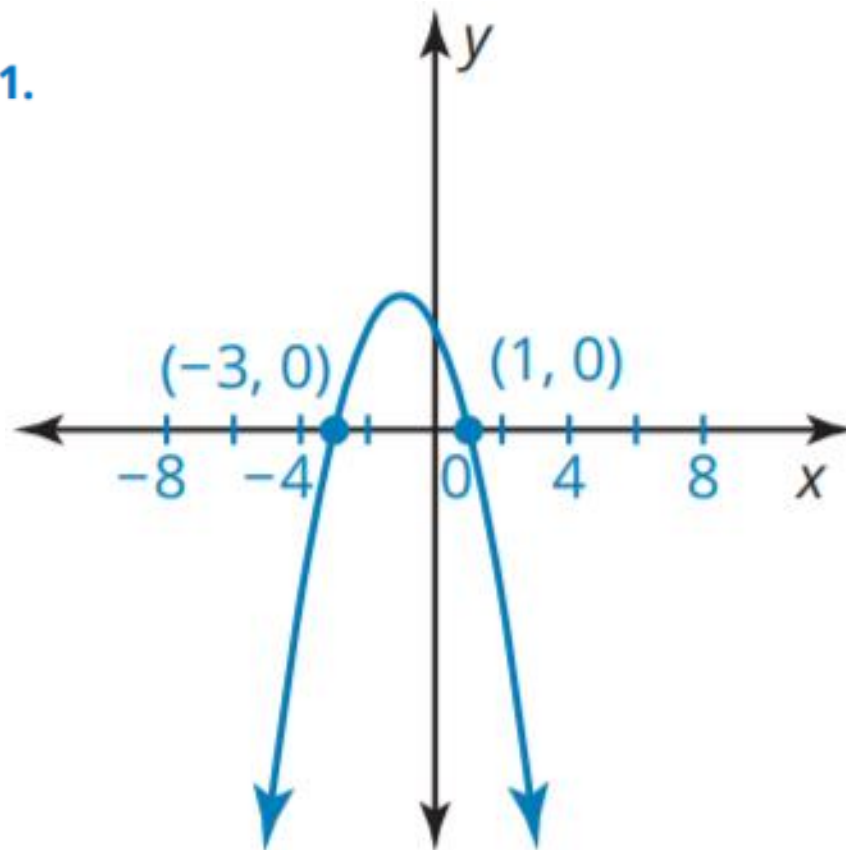3. **Use the given information to write a function in factored form. Sketch a graph of each function and label key points, which include the vertex, the *x*- and *y*-intercepts.**

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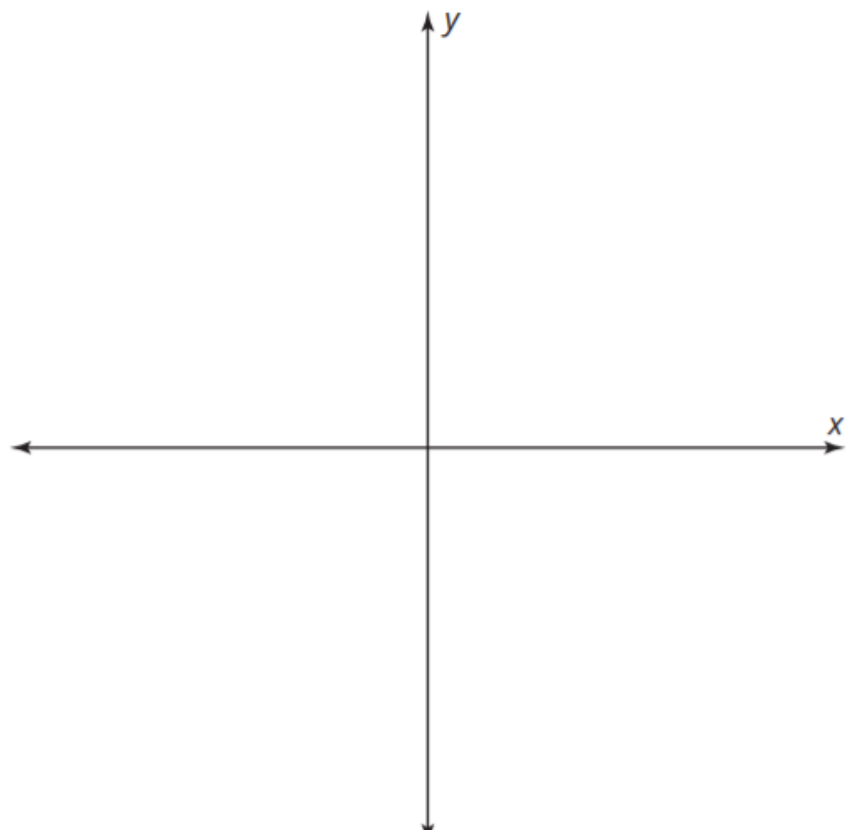a. **The parabola opens upward, and the zeros are at $x = 2$ and $x = 4$.**
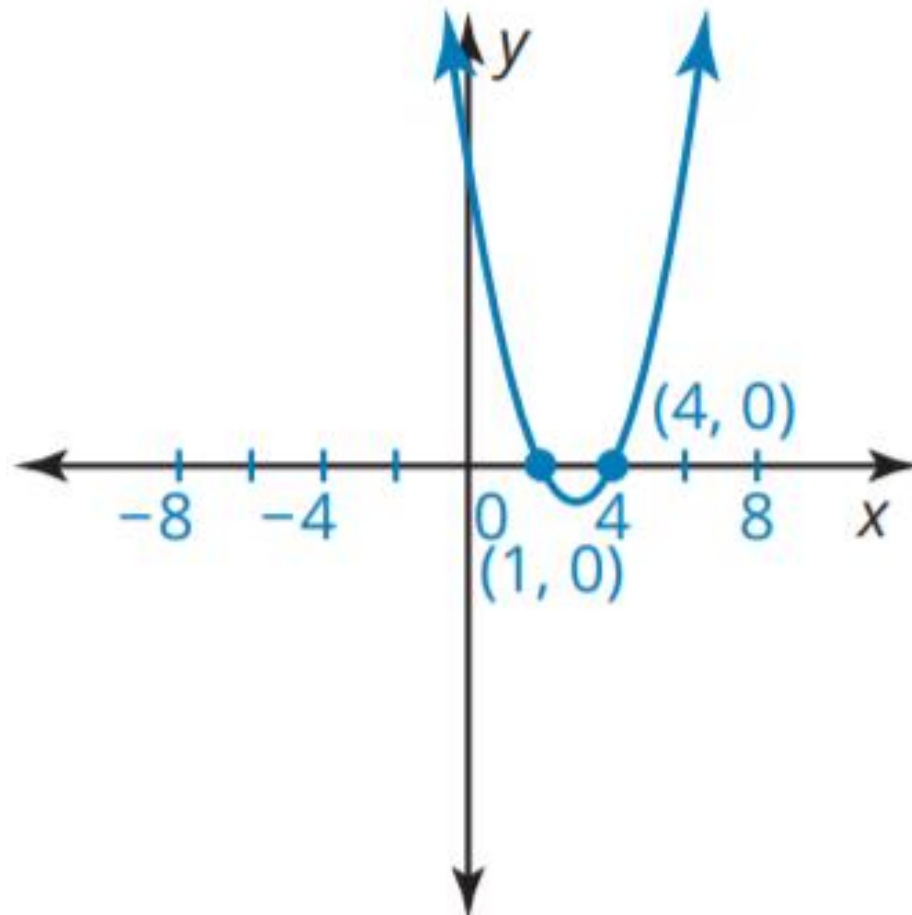
b. The parabola opens downward, and the zeros at $x = -3$ and $x = 1$.
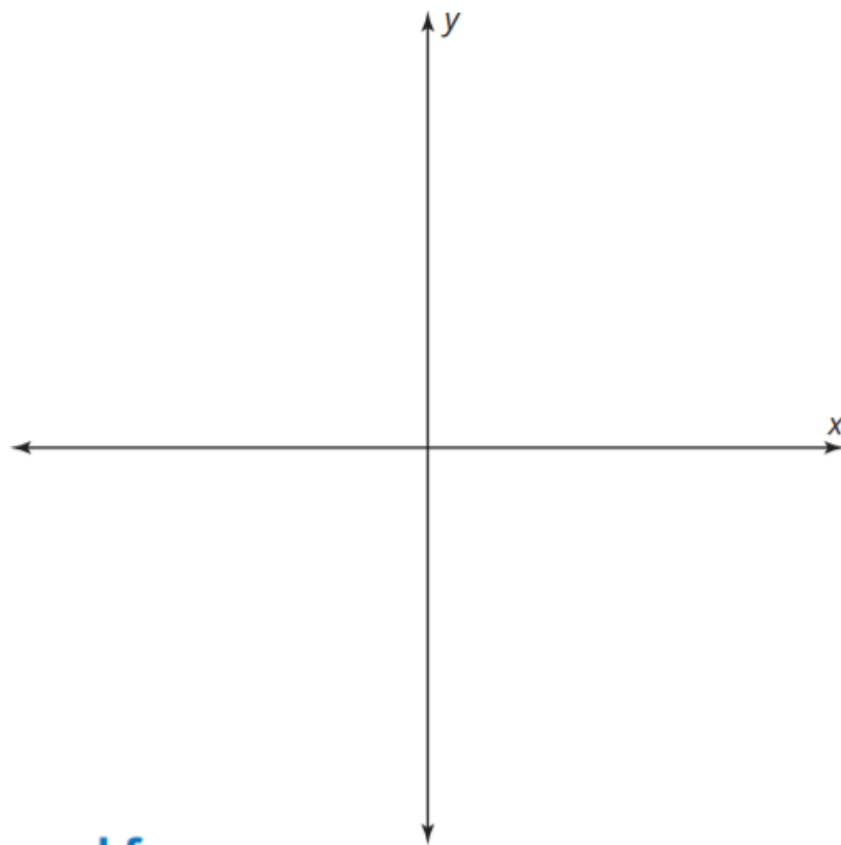
$(-3, 0)$ $(1, 0)$

3. Use the given information to write a function in factored form. Sketch a graph of each function and label key points, which include the vertex, the x- and y-intercepts.

c. The parabola opens downward, and the zeros are at $x = 0$ and $x = 5$.

d. The parabola opens upward, and the zeros are at $x = -2.5$ and $x = 4.3$.

3. **Use the given information to write a function in factored form. Sketch a graph of each function and label key points, which include the vertex, the x- and y-intercepts.**

Use DESMOS to complete pages M3 184-186

Make sure you are understanding the process for any future assessment!