

## Warm Up

Calculate the zeros of each function.

1.  $f(x) = -3x + 2$

2.  $f(x) = x^2 - 3x + 2$

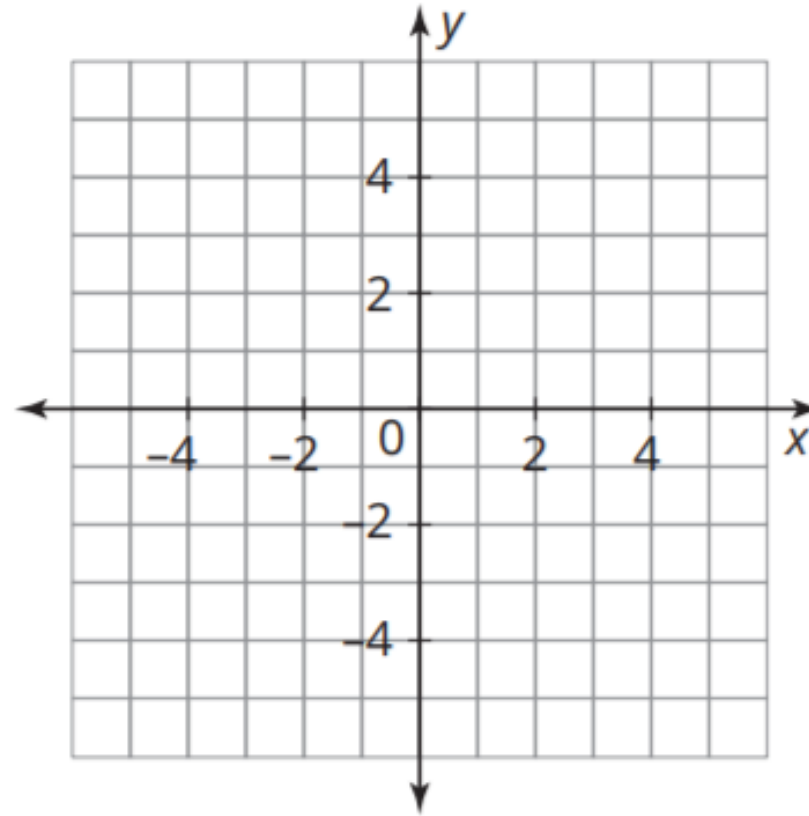
3.  $f(x) = (x - 2)(x^2 - 1)$

1. Sketch a set of functions whose product builds a cubic function with the given characteristics. Explain your reasoning. Then list similarities and differences between your graphs and your classmates' graphs.

a. zeros:  $x = 0$ ,  $x = 2$ , and  $x = -5$

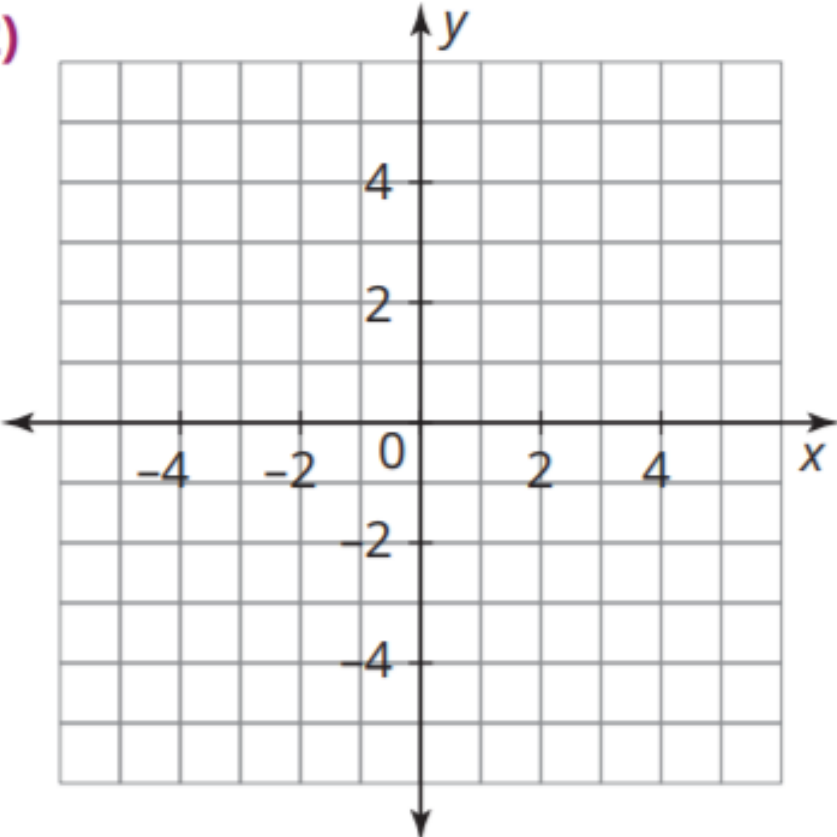
Explanation:

Similarities/Differences:



b. zeros:  $x = -3, x = 4$  (multiplicity 2)

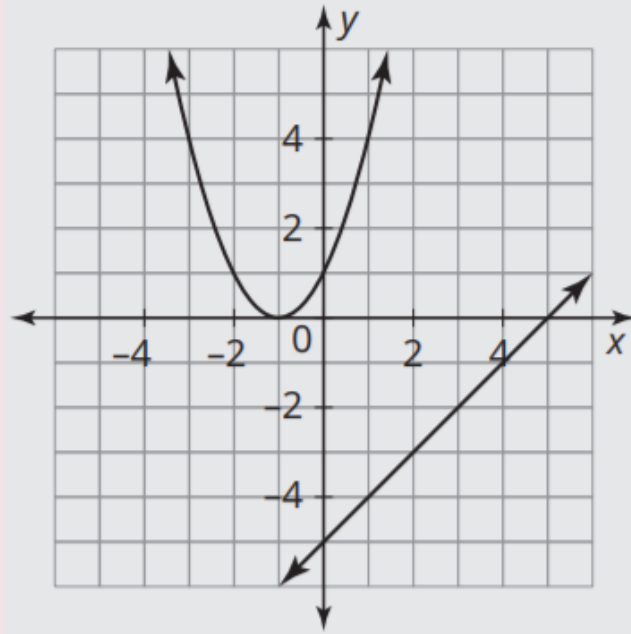
Explanation:



Similarities/Differences:

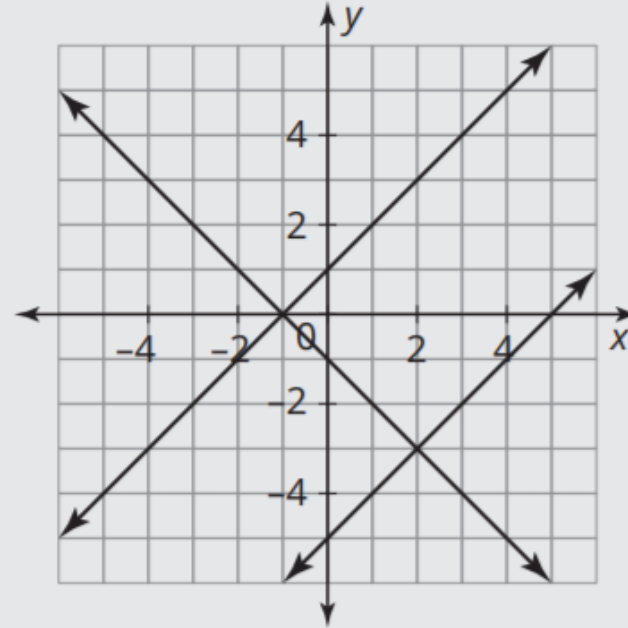
2. Derek and Alex disagree over which functions (when multiplied together) build a cubic function with zeros  $x = 5$ ,  $x = -1$  (multiplicity 2).

Derek



I sketched a parabola with vertex  $(-1, 0)$  and a line with x-intercept at  $(5, 0)$ .

Alex



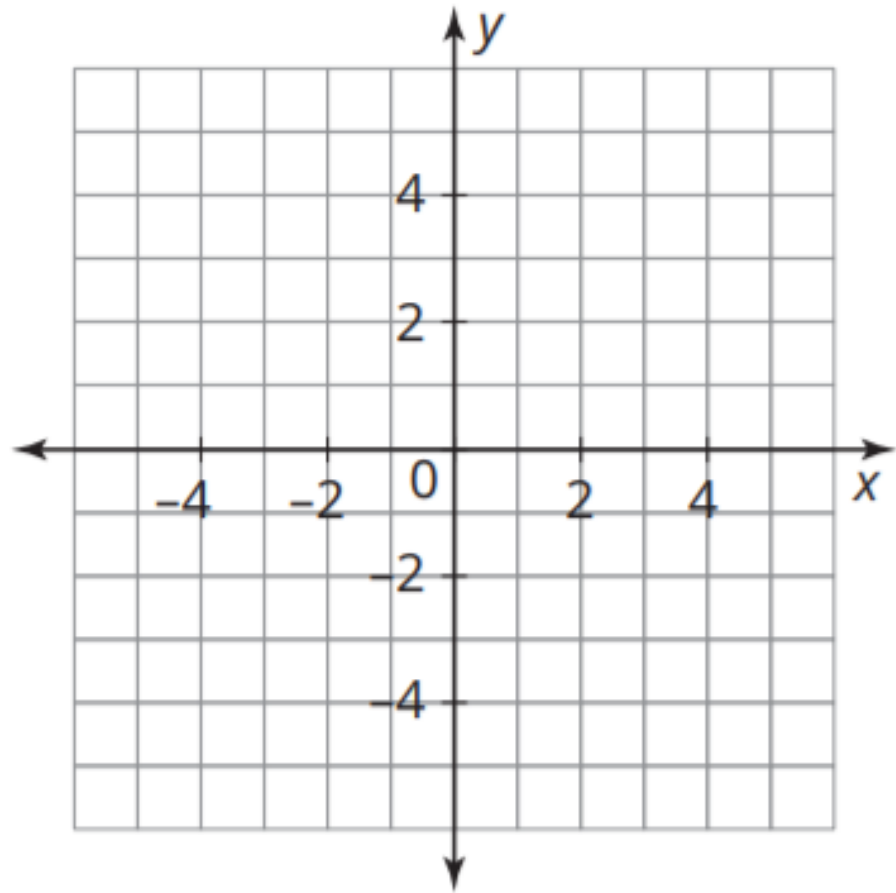
I sketched three linear functions, each with an x-intercept that matches the zero.

**1. Analyze the linear and quadratic functions that are shown.**

$$f(x) = x \quad g(x) = x + 1 \quad h(x) = x - 1 \quad j(x) = -x + 1$$

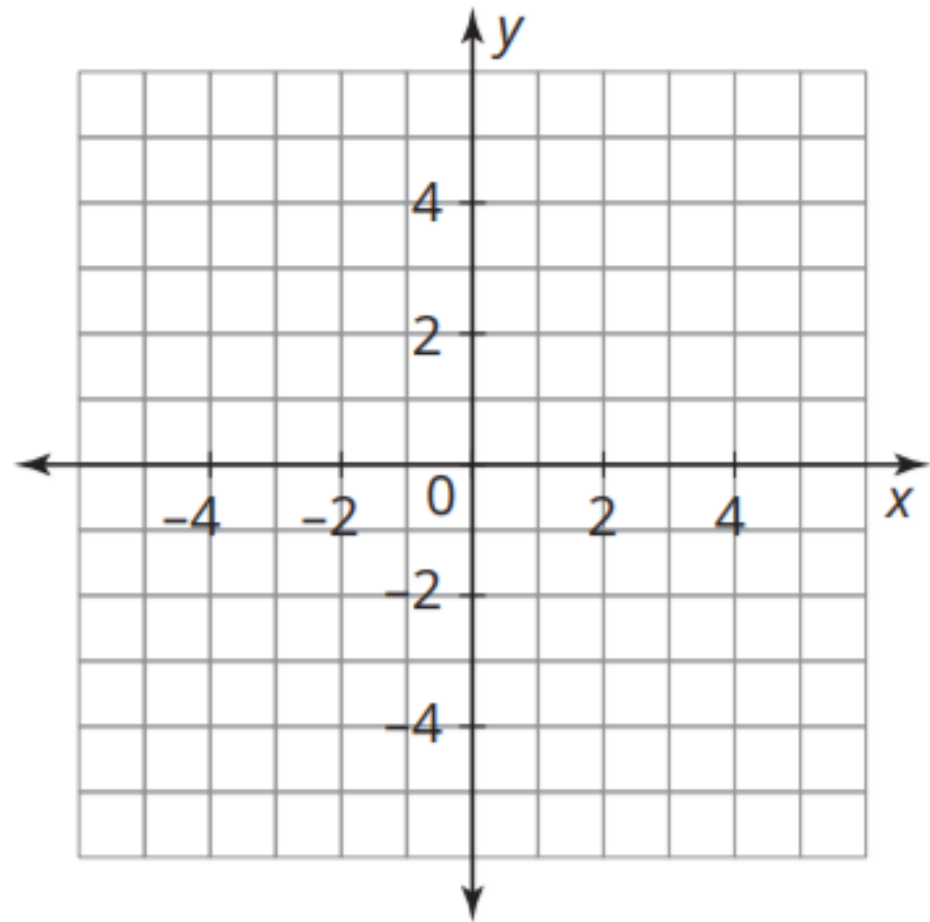
$$m(x) = x^2 \quad p(x) = x^2 + 1 \quad r(x) = (x - 1)^2 \quad w(x) = -(x - 1)(x + 1)$$

**Choose a set of functions from the functions provided whose product builds a cubic function with the given characteristics. Explain your reasoning. Then list similarities and differences between your graphs and your classmates' graphs.**



**a. two imaginary zeros and a real zero**  
**Explanation:**

**Similarities/Differences:**



**b.  $y$ -intercept of  $(0, -1)$**

**Explanation:**

**Similarities/Differences:**