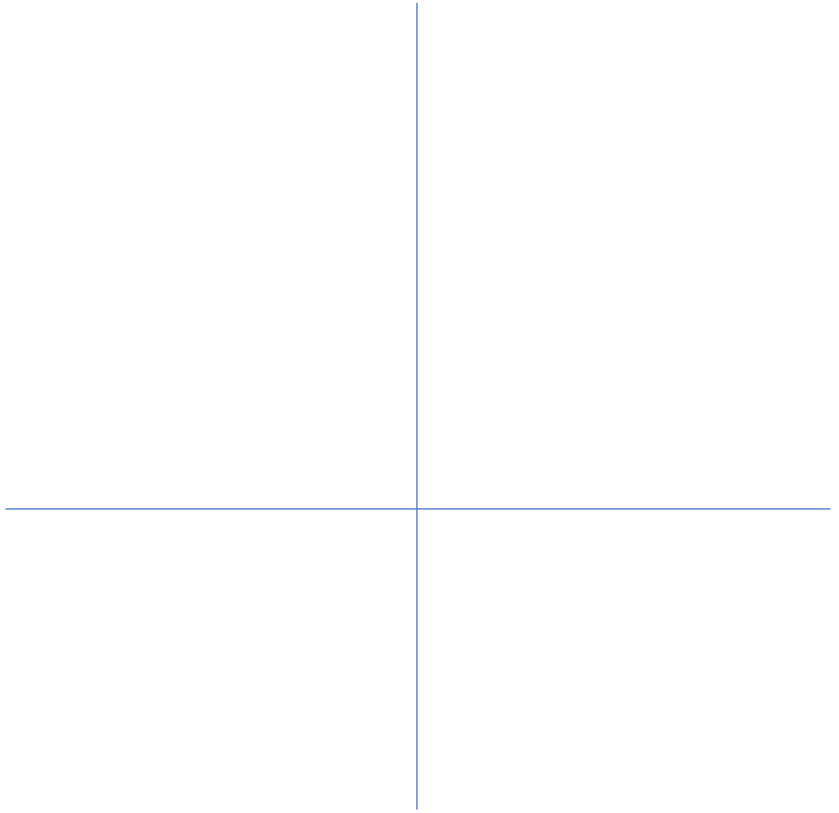
Find the Average rate of change for the interval between 0 and 1 for the function

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

$$f(0) =$$

$$f(1) =$$



Think about the two functions you studied in the previous activity.

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

$$g(x) = 2x^2 - 4x - 30$$

1. Compare the two functions. Show your work and explain your reasoning.

a. Which function has the lowest minimum point?

$g(x)$

b. Which function has a greater value at $x = 8$?

$f(8) =$ $g(8) =$

c. Which function has a greater value at $x = 9$?

2. Complete the table to compare the average rate of change of the two functions on the given intervals. Show your work.

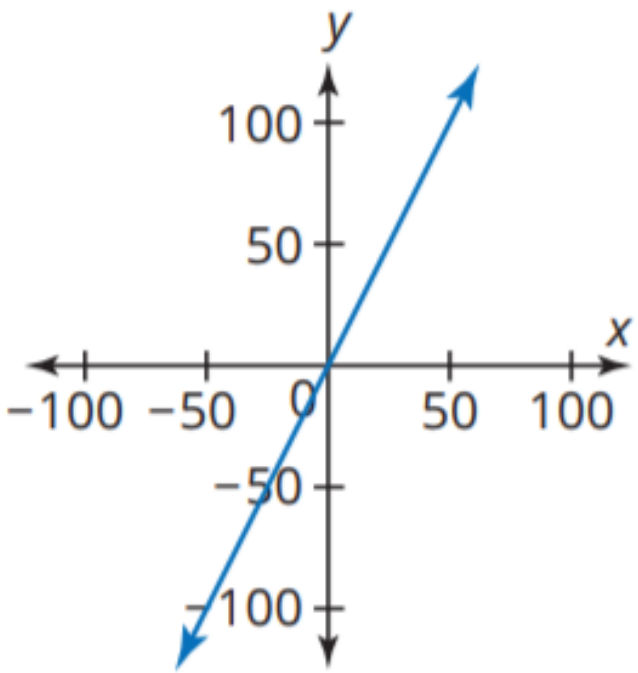
Interval	Average Rate of Change $f(x) = x^2 + 2x - 3$	Average Rate of Change $g(x) = 2x^2 - 4x - 30$
[0, 1]	$\frac{0-(-3)}{1-0} =$	$\frac{-32-(-30)}{1-0} =$
[0, 2]		
[0, 3]		
[4, 5]		

The average rate of change of any function over an interval is the slope of a linear function passing through the beginning and end points of the interval.

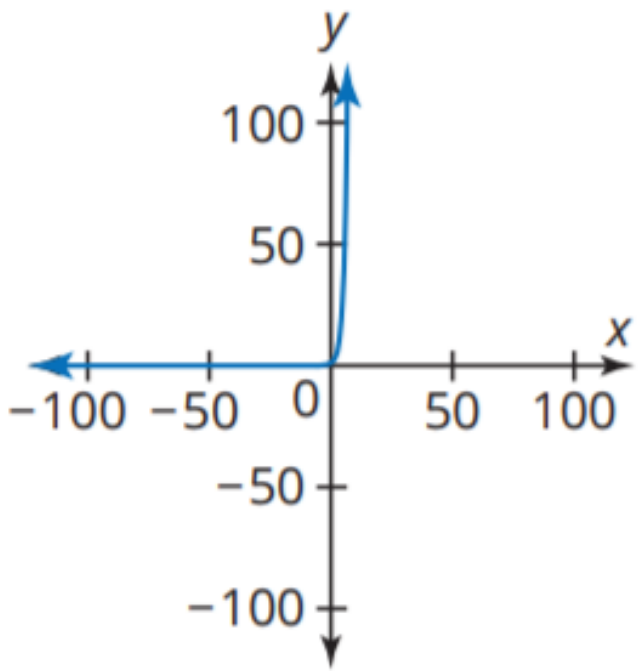
Let's compare a quadratic function with other function types you have studied. You can say that a quadratic function increases or decreases quadratically, so a linear function increases or decreases linearly, and an exponential function increases or decreases exponentially.

4. Consider the linear, exponential, and quadratic functions shown.

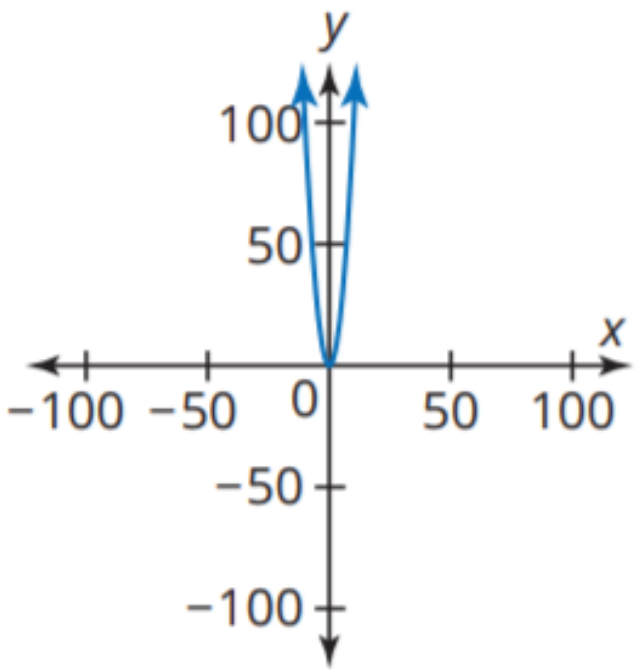
$h(x) = 2x$



$j(x) = 2^x$



$k(x) = x^2$



a. **At what point do the three graphs intersect? Explain how you know.**

b. **Which function do you think has the greatest average rate of change from negative infinity to positive infinity? Explain your reasoning.**

The table shown organizes the average rates of change of the three functions across different intervals of their domains. Some of the rates have been provided.

	[−10, 10]	[10, 100]	[100, 1000]
$h(x) = 2x$			
$j(x) = 2^x$		6.34×10^{27}	1.07×10^{298}
$k(x) = x^2$	0		

10. **Parker says that any function increasing exponentially will eventually have a greater value than any function increasing linearly or quadratically.**

    Is Parker correct? Explain why or why not.