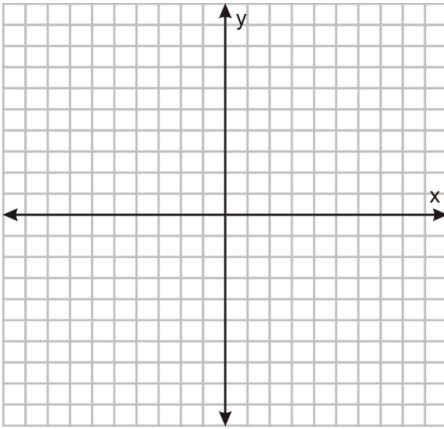**Graph the parent function of a quadratic:** $f(x) = x^2$

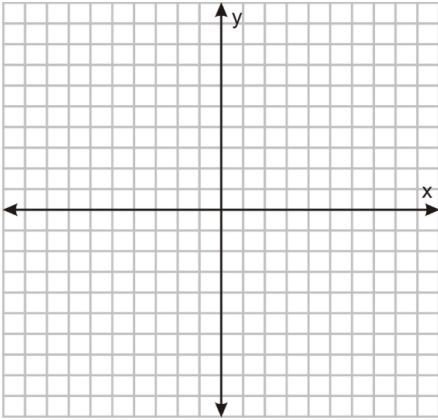Vertex:

Axis of Symmetry:

Opens:

Domain:

Range:

Intervals when the Quadratic is increasing and decreasing.

Increasing: A function increases if the y-values go up as you read the graph from left to right.

**Decreasing:** A function decreases if the y-values go down as you read the graph from left to right.

Now let's look at the graph of $f(x) = ax^2$. Notice what happens to the graph as a changes.

1) What do you notice?

2) What happens when a is negative?

3) When is the graph of the function $f(x) = -x^2$ positive and when is it negative?
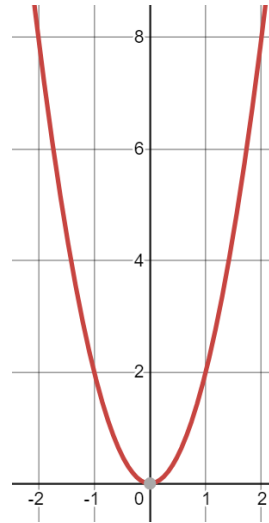
Rate of Change:

Let's compare the rate of change over the interval $x \in (0,2)$ for quadratics with different a values.
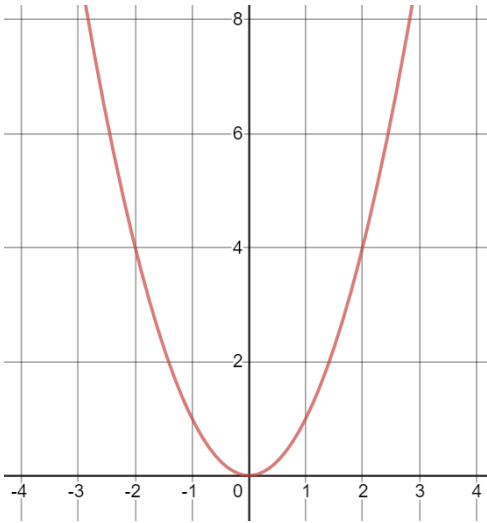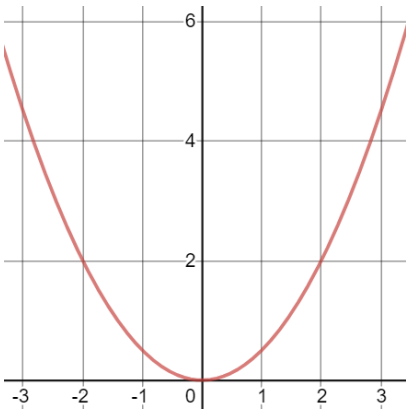
$f(x) = x^2$ $g(x) = 2x^2$

$h(x) = \dfrac{1}{2}x^2$

Which function had the greatest rate of change over the interval $x \in (0,2)$?