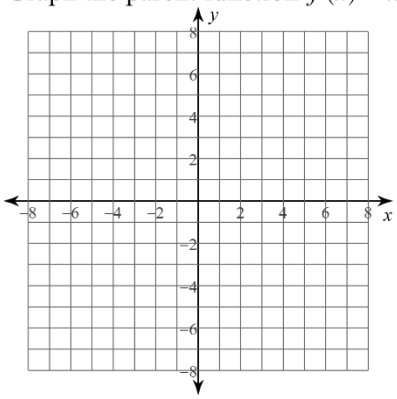
Transformations of Quadratic Functions Name: _____

A **parent function** is the simplest **function** of a family of **functions**

The parent function of all quadratics is f(x) = x^2

Graph the parent function $f(x) = x^2$

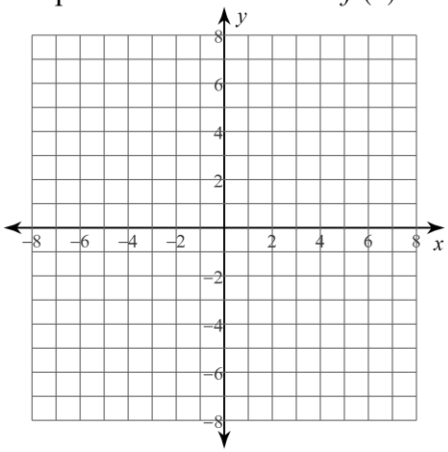


Today we are going to discover transformations of quadratic functions. Choose 2 different color pencils. On each graph below draw the parent function and then the transformation. Then answer the questions about what happens to the graph for each transformation.

Let's see what happens to our graph when we multiply it by something.

First let's try something bigger than 1.

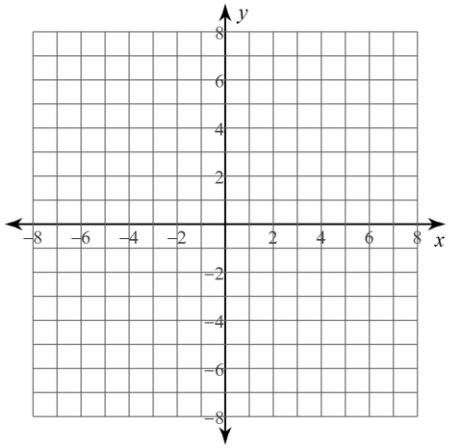
Graph the transformation $f(x) = 2x^2$



How did the graph change from the parent graph?

Now let's try something smaller than 1.

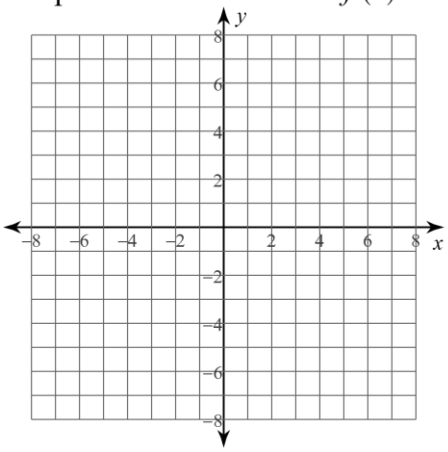
Graph the transformation $f(x) = \frac{1}{2}x^2$



How did the graph change from the parent graph?

Last let's try something less than zero.

Graph the transformation $f(x) = -x^2$



How did the graph change from the parent graph?

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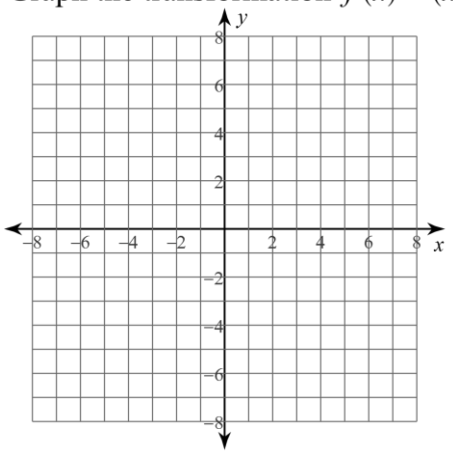
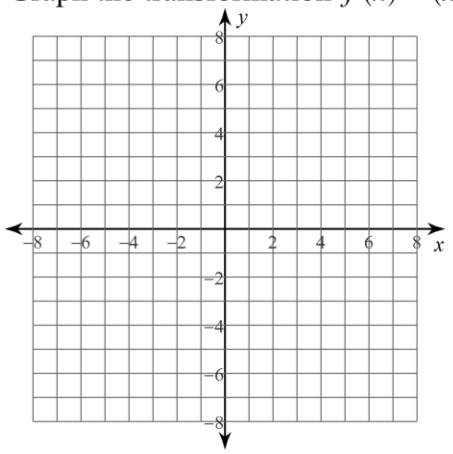
Now let's see what happens when we add or subtract from our x before we square it.

Graph the transformation $f(x) = (x-2)^2$



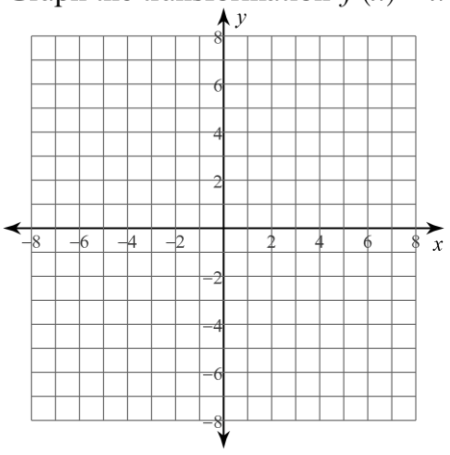
Graph the transformation $f(x) = (x+2)^2$



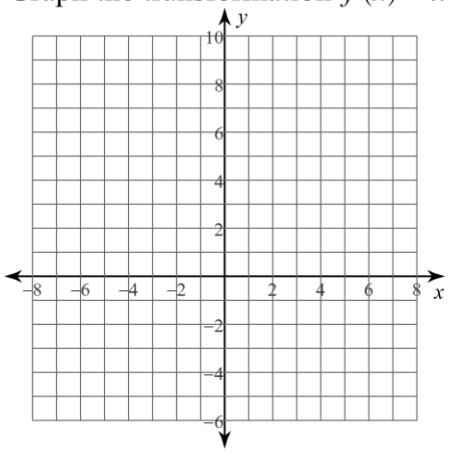
What did you notice happened?

Now lets see if something different happens if we square our x first and then add or subtract.

Graph the transformation $f(x) = x^2 - 2$



Graph the transformation $f(x) = x^2 + 2$



What did you notice happened?

Transformations of Quadratic Functions Name: _____

Vertex Form

Vertex form of a quadratic function is $f(x) = a(x - h)^2 + k$

Use the information from your graphs to describe what happens when each variable is changed.

Describe what happens when $a > 1$	
Describe what happens when $0 < a < 1$	
Describe what happens when $a < 1$	
Describe what happens when $h > 1$	
Describe what happens when $h < 1$	
Describe what happens when $k > 1$	
Describe what happens when $k < 1$	

Describe the transformation of each function.

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

b) $f(x) = -3(x+4)^2 - 4$

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

d) $f(x) = (x+2)^2 + 4$

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

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

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