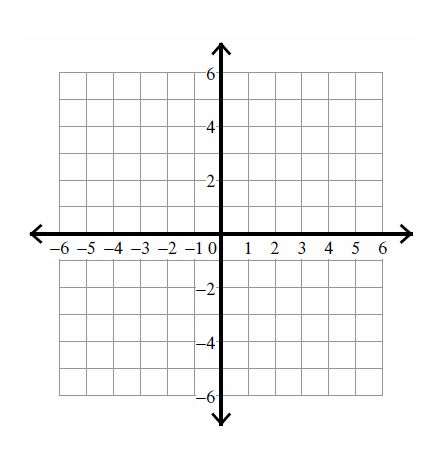
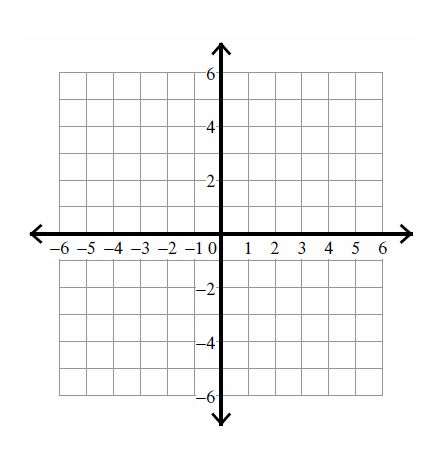
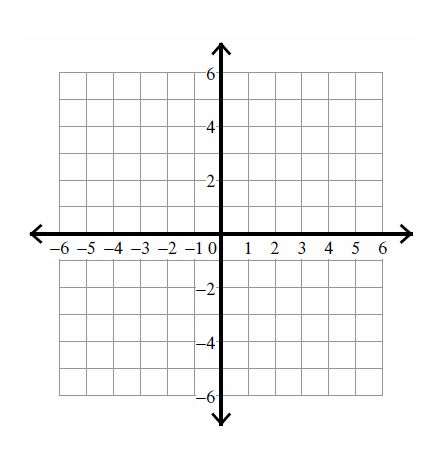
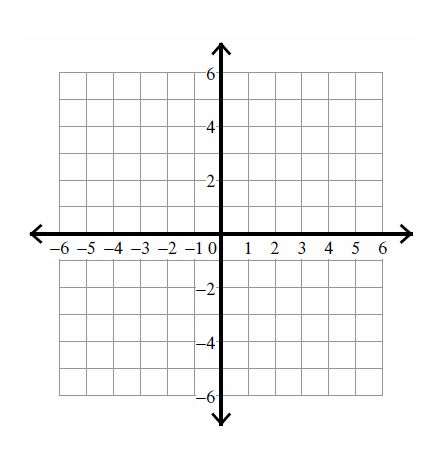
Alg2/Trig

**Transformations of Parent Functions INVESTIGATION**

Today you’re going to discover how all functions behave under transformations. Let’s start out by graphing the parent functions we will be using.

1. Graph the following parent functions.

a. y = x b. y = x2 c. y = |x| d. y= 

*Part A- Shifting Our Thinking*

2. Using desmos.com or a graphing calculator, graph y = x2 and y = (x-3)2

Sketch the graph of y = (x-3)2 at right.

a. How does the graph compare to the graph of the parent function?

3. Using desmos.com or a graphing calculator, graph y = x2 and y = (x+4)2

Sketch the graph of y = (x+4)2 at right.

a. How does the graph compare to the graph of the parent function?

4. Using desmos.com or a graphing calculator, graph y = x2 and y = x2 + 3.

Sketch the graph of y = x2 + 3 at right.

a. How does the graph compare to the graph of the parent function?

5. Using desmos.com or a graphing calculator, graph y = x2 and y = x2 - 2.

Sketch the graph of y = x2 -2 at right.

a. How does the graph compare to the graph of the parent function?

6a. Predict how the graph of y = (x+1)2 + 4 will compare to the graph of y = x2. Write down your prediction!

b. Graph y = (x+1)2 + 4 using desmos.com or a calculator. Was your prediction correct? What happened?

7a. Predict how the graph of y = |x - 5|+ 2 will compare to the graph of y = |x|. Write down your prediction!

b. Graph y = |x-5|+ 2 using desmos.com or a calculator. (To graph absolute value on a calculator, go to MATH, tap to the right to go to NUM, and then select “1:abs(“. Was your prediction correct? What happened?

8a. Predict how the graph of y =  will compare to the graph of y = . Write down your prediction!

b. Graph y =  using desmos.com or a calculator. Was your prediction correct? What happened?

**Part A-Conclusions**

a. How will the graph of y = f(x + 3) compare to the graph of y = f(x)?

b. How will the graph of y = f(x – 2) compare to the graph of y = f(x)?

c. How will the graph of y = f(x) + 4 compare to the graph of y = f(x)?

d. How will the graph of y = f(x) – 5 compare to the graph of y = f(x)?

**Part B-** *Reflecting on a New Type of Transformation*

Sketch a graph of y = at right. Actual

1. Using desmos.com or a calculator, graph . Sketch the graph at right. Actual

How does the graph compare to the graph of the parent function?

1. Using desmos.com or a calculator, graph y . Sketch the graph at right. Actual  
   How does the graph compare to the graph of the parent function?
2. Make a prediction. What will the graph look like? Prediction Actual

Using technology, graph . Sketch the graph at right.

How does the graph compare to the graph of the parent function?

1. Predict what the graph of will look like. Prediction Actual

Using technology, graph . Sketch the graph at right.   
How does the graph compare to the graph of the parent function?

1. Predict what the graph of will look like. Prediction Actual

Using technology, graph . Sketch the graph at right.   
How does the graph compare to the graph of the parent function?

Why does this happen???

6. Predict what the graph of + 4 will look like. Prediction Actual

Using technology, graph + 4 . Sketch the graph at right.

How does the graph compare to the graph of the parent function y = x2?

7. Predict what the graph of will look like. Prediction Actual

Using technology, graph . Sketch the graph at right.   
How does the graph compare to the graph of the parent function y= ?

8. Predict what the graph of will look like. Prediction Actual

Using technology, graph . Sketch the graph at right.   
How does the graph compare to the graph of the parent function y= ?

Part B-Conclusions

a. How will the graph of y = -f(x) compare to the graph of y = f(x)?

b. How will the graph of y = f(-x ) compare to the graph of y = f(x)?

c. How does the graph of y = -|x+2|+3 compare to its parent function of y = |x|?

**Part C-** *Stretching Our Understanding of Transformations*

1. Using desmos.com or a calculator, graph both and y = 2x2. Sketch both graphs at right.

How does the graph compare to the graph of the parent function?

2. Using desmos.com or a calculator, graph both and y = 3x2. Sketch both graphs at right.

How does the graph compare to the graph of the parent function?

3. Using desmos.com or a calculator, graph both and y = x2. Sketch both graphs at right.

How does the graph compare to the graph of the parent function?

4. Using desmos.com or a calculator, graph both and y = x2. Sketch both graphs at right.

How does the graph of y = x2  compare to the graph of the parent function?

5. Predict what the graph of will look like. Prediction Actual

Using technology, graph and y = |4x|. Sketch both at right.

How does the graph of y = |x| compare to the graph of the parent function?

5. Predict what the graph of will look like. Prediction Actual

Using technology, graph and . Sketch both at right.

How does the graph of . compare to the graph of the parent function?

**Part C- Conclusions**

Multiplying either the input by a number, y=f(3x) for example, or the output by a number, y = 3f(x), are both examples of dilations. Dilations are stretches; proportional shrinks or enlargements.

Dilations are more difficult to identify because a stretch vertically could also be represented by a horizontal compression.

