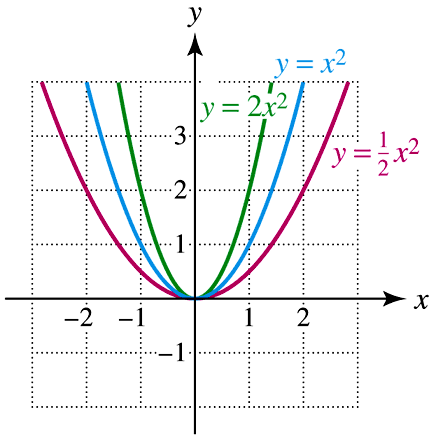
**Unit 1 - Lesson #3:** **Functions Transformations**



**Learning Targets:**

A parent function is the simplest form, in the set of functions that form a family. Each function in the family is a transformation of the parent function.

A new function is created when a parent function undergoes transformation and is given a new function rule (equation).

A vertical translation is when a constant is added or subtracted from the function.

A horizontal translation is when a constant is added or subtracted from the domain.

A vertical stretch or compression is when a scale factor is multiplied to the function.

A reflection is the x-axis is when the function is negated.

A reflection in the y-axis occurs if the domain is negated.

The order of doing the transformations is important.

Concept Summary: Transformations of

***Vertical Translations:*** ***Reflections:***

Up units: in – axis:

Down units: in – axis:

***Horizontal Translations:***  ***Vertical Stretches and Compressions:***

Right units: Vertical Stretch:

Left units: Vertical Compression:

So, if f(x) = x2, s(x) = x2 + 2, v(x) = (x + 3)2, and z(x) = (x – 4)2 – 1 …

How does s(x) look compared to f(x)?

How does v(x) look compared to f(x)?

How does z(x) look compared to f(x)?

Million Dollar Question: If applying more than one movement/translation, what order do these movements happen?

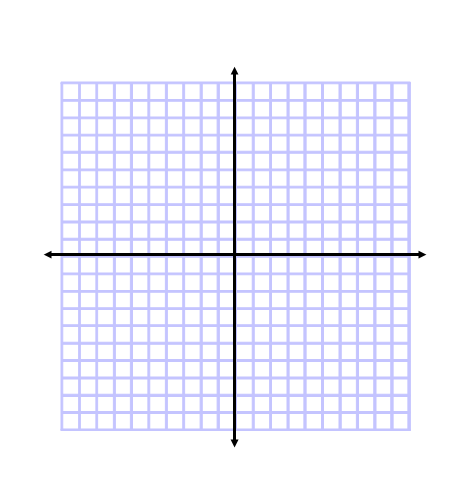
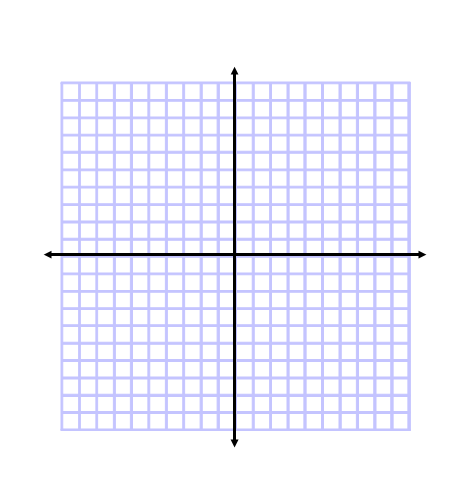
Order of Transformations:

**Example 1:** Combining Transformations

If , sketch each of the following:

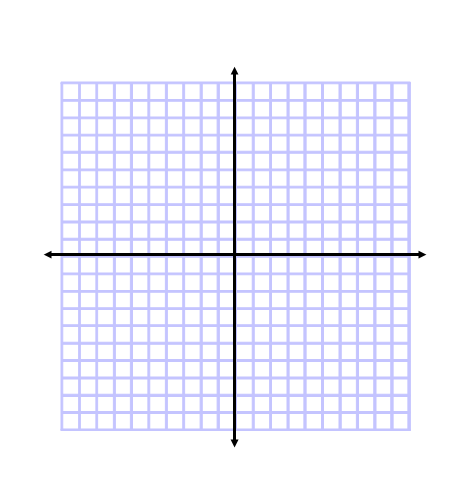
1) 2)

Equation: Equation:

 Transformations: Transformations:

3)

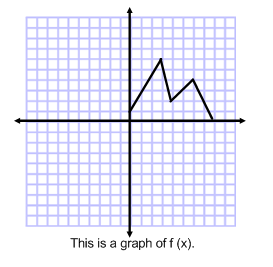
Equation:

 Transformations:

**Example 2:** Describe the transformations necessary to change to , in the correct order.

a) and

b) and

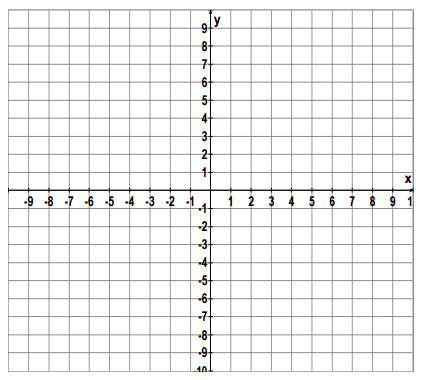
**Example 3:**

Sketch , ,

**Example 4:** If , write the equation for each of the following transformations:

**Example 5:** If , write the equation of that has a vertical stretch of factor 10, a reflection over the y-axis, a horizontal shift of 6 to the left, and a vertical shift down 3.

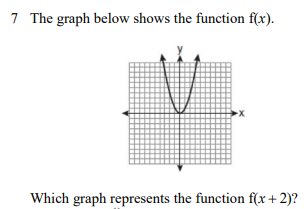
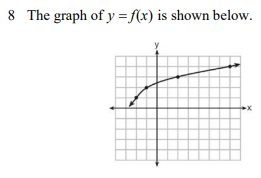
**Piecewise Functions**



Is a function? Explain.

**Homework 1-3:**

**\*\*\*ALGEBRA 2 REGENTS REVIEW\*\*\***

Which graph represents f(x) – 2 ?

