Lesson 1.8 Objective: SWBAT determine and describe transformations of functions.

Kickoff

Identify the transformations that map

$$f(x) \rightarrow g(x)$$
$$f(x) = x^2$$
$$g(x) = -(x-2)^2 + 4$$

right 2
up 4
reflection over x-axis

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Homework

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Non Rigid Transformations- Change Shape or size of the function

Vertical Stretch- Closer to the y-axis

$af(x)$ $a>1$

Vertical Shrink- farther from y-axis

fraction

$0<a<1$

"Compressed"

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Putting them all together....

Function Notation

reflection over x-axis

$$-af(x \pm h) \pm k$$

Stretch/Shrink

reflection over y-axis

horizontal Shift

*Opposite

vertical Shift

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***ORDER TO FOLLOW TRANSFORMATIONS**

1) horizontal Shift
2) * Shrink/Stretch
3) * reflection
4) vertical Shift

(Think PEMDAS)

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Describe the following transformations that map $f(x) \rightarrow g(x)$

1) $f(x) = \sqrt{x}$
$g(x) = -3\sqrt{x} - 1$

① Stretch of 3
② reflected over x-axis
③ down 1

2) $f(x) = x^3$
$g(x) = 3(x+1)^3$

① left 1
② Stretch 3

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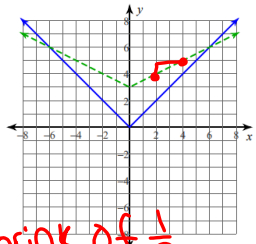
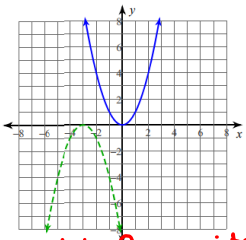
Describe the transformations from the solid line to the dashed line.

3)



Shrink of 1/2
UP 3 units

4)



left 3 units
reflect over x-axis

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Write the equation for the following transformations.

5) Rational Function

Left 4 units

Reflection over y-axis

Up 5 units

$f(x) = \frac{1}{-x+4} + 5$

6) Quadratic Equation

Right 2 units

Shrink of 1/2

Reflection over x-axis

Down 2 untis

$f(x) = -\frac{1}{2}(x-2)^2 - 2$

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Worksheet

1-3, 7-8, 11-12, 15

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Describe in words each transofrmation in the correct order.

1) f(x – 1) + 5

2) 2g(x – 1)

3) -3g(x) – 7

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Write each description using function notation.

7) A reflection over the x axis and a shift left 2 _____

8) A vertical shift of ½ and a shift up 7 _____

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Write each discription using the function given.

11) A quadratic function with a vertical stretch of 4, a shift up 2 and right 7 _____

12) A cubic function that has a horizontal shift right 3 and then reflects over the x- axis and then shifts down 4 units. _____

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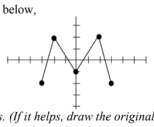
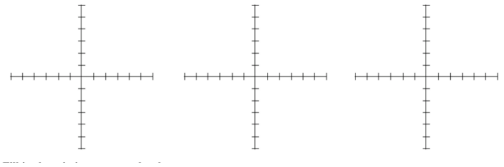
15) Using the graph of h(x) pictured below,



Sketch the following transformations. (If it helps, draw the original function)

h(x - 1) + 3 **–h(x + 2) – 3** **–h(x -3) + 2**



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