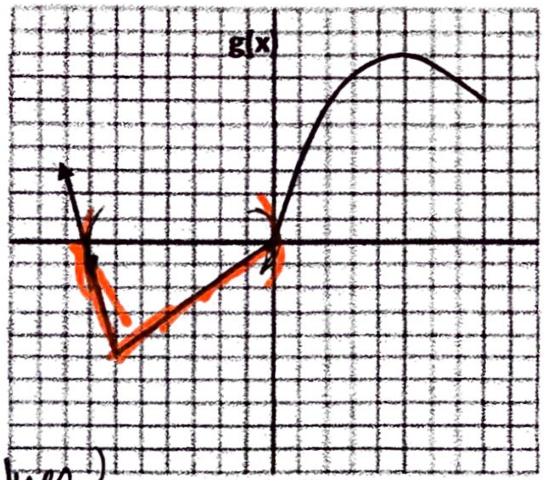
Unit 1 **Function Warm Up**

1. **Given g(x) to the right:**



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   a) State the domain of g(x). $(-\infty, 8]$

   b) State the range of g(x). $[-5, \infty)$

   c) g(−7)= $\underline{-1}$ g(0) = $\underline{0}$

   d) g($\underline{5}$) = 8 g($\underline{-6}$) = -5

   $6 + -3$

   e) g(2) + g(-4) = $\underline{3}$

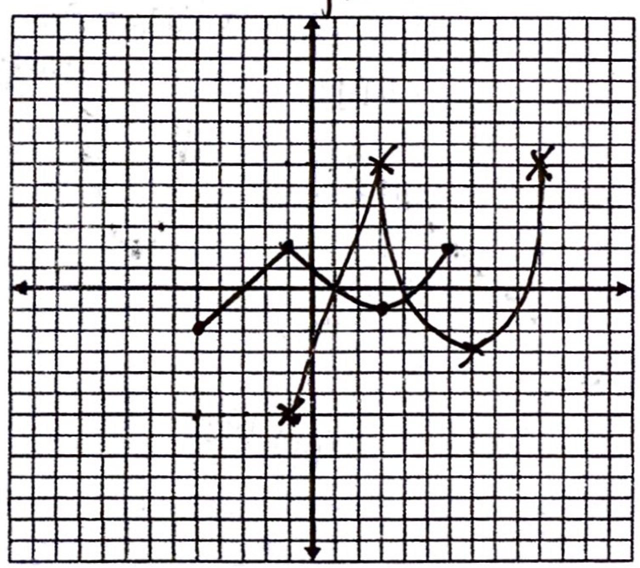
   $y \leq 0 \rightarrow$ negative y-values

   f) For what values is $g(x) \leq 0$? You may approximate here. $[-7, 0]$

   g) g($\underline{1}$) and g($\underline{-8}$) = 3

   h) Is g(x) a one to one function? $\underline{no}$ Explain why or why not. it does not pass horiz. line test

2. **Given h(x) to the right:**



   a) State the domain of h(x)? $[-5, 6]$

   b) State the range of h(x)? $[-2, 2]$

   c) State the steps needed to graph 3h(x −4)

   vertical stretch by 3

   Next graph it. right 4

   What is the domain of this "child" of h(x)?

   $[-1, 10]$

   What is the range of this "child" of h(x)?

   $[-6, 6]$

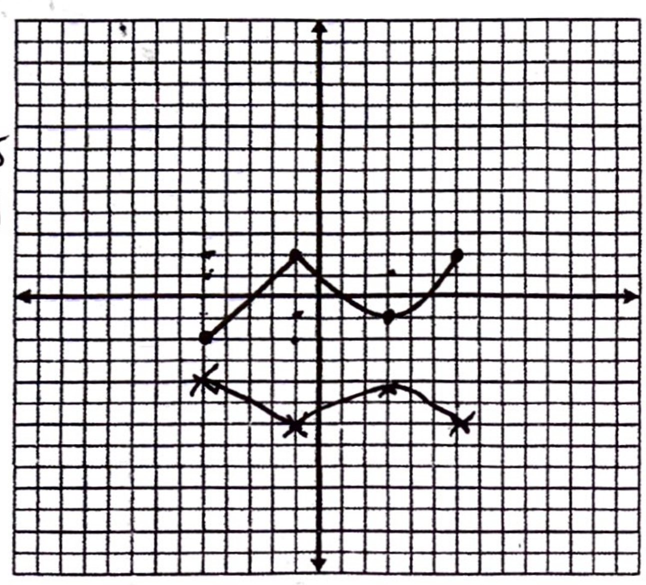
   d) State the steps needed to graph $-\frac{1}{2}h(x)-5$

   reflection over x-axis

   vertical compression by $\frac{1}{2}$

   Next graph it on the second graph.

   down 5



   What is the domain of this "child" of h(x)?

   $[-5, 6]$

   What is the range of this "child" of h(x)?

   $[-6, -4]$

Math 2: Algebra 2, Geometry and Statistics
Ms. Sheppard-Brick 617.596.4133
http://lps.lexingtonma.org/Page/2434

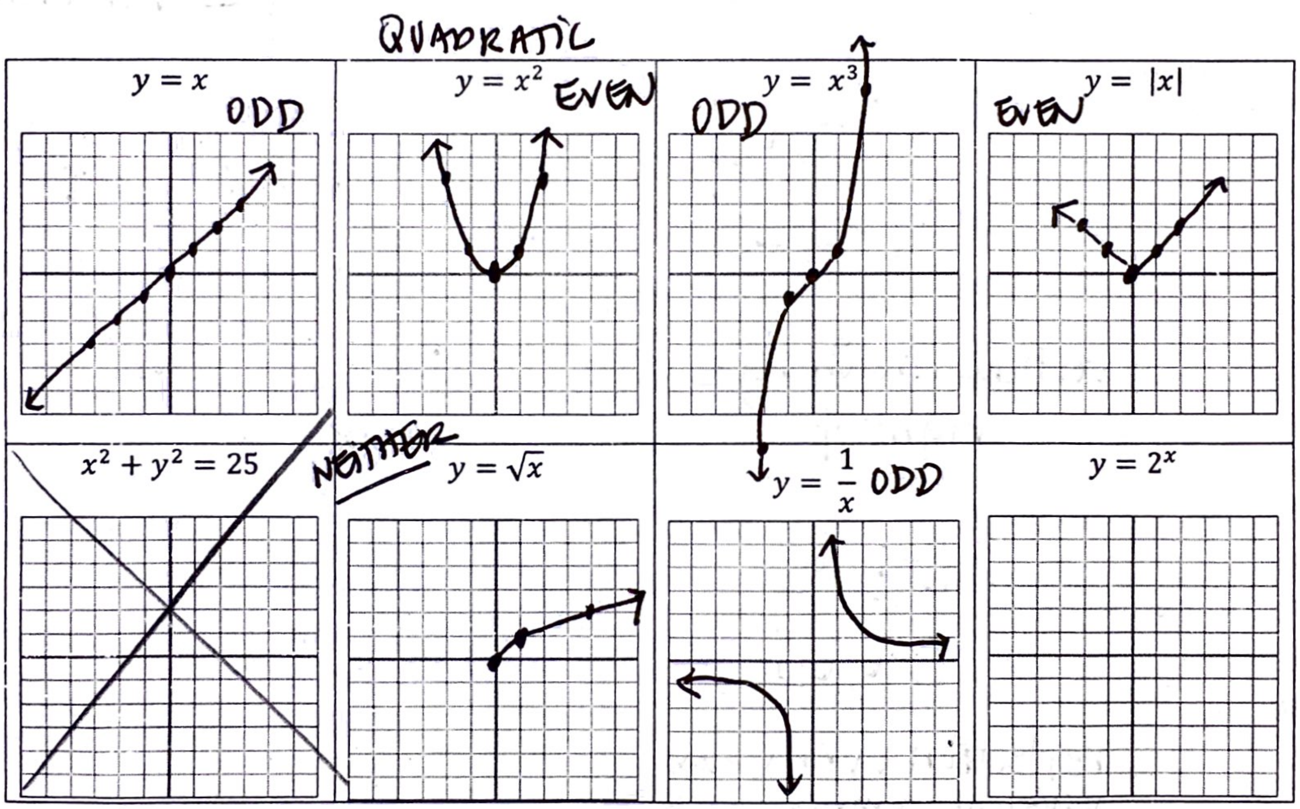
Function/Graph Transformation Quiz Review

Students Will Be Able To:

- Recognize the basic graphs including: $y = x, y = x^2, y = x^3, y = |x|, x^2 + y^2 = 1$, $y = 2^x, y = \sqrt{x}$, and $y = \frac{1}{x}$.
- Translate basic graphs up down, left and right and determine the resultant equation.
- Reflect basic graphs over the x-axis or the y-axis.
- Dilate (stretch or shrink) graphs by a given factor.
- Compose multiple transformations.

EVEN – symmetric with y-axis
ODD – symmetric with origin

Basic Graphs: Sketch each of the basic graphs below. Show at least 3, preferably 5 specific points.



Reference Information

Translations of $y = f(x)$: (Assume that a is a positive number.)

$y + a = f(x)$ OR $y = f(x) - a$	Results in the graph shifting down a units
$y - a = f(x)$ OR $y = f(x) + a$	Results in the graph shifting up a units
$y = f(x + a)$	Results in the graph shifting left a units
$y = f(x - a)$	Results in the graph shifting right a units

Reflections of $y = f(x)$:

$y = -f(x)$	Results in the graph reflecting over the x-axis
$y = f(-x)$	Results in the graph reflecting over the y-axis

Scalings of $y = f(x)$:

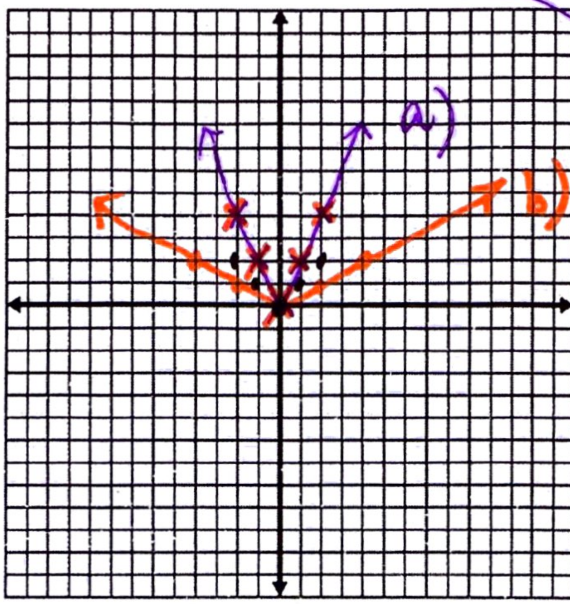
$y = af(x)$ OR $\frac{y}{a} = f(x)$	Results in the graph becoming a times as tall
$y = \frac{1}{a}f(x)$ OR $ay = f(x)$	Results in the graph becoming $\frac{1}{a}$ times as tall
$y = f(ax)$	Results in the graph becoming $\frac{1}{a}$ times as wide
$y = f\left(\frac{1}{a}x\right)$	Results in the graph becoming a times as wide

1. **Graph the function $y = |x|$ with each of these functions using transformational graphing.**

   a. $y = 2|x|$ b. $y = \left|\frac{x}{2}\right|$ c. $y = 2\left|\frac{x}{2}\right|$

   Which of the functions a-c is identical to the parent? How do the other two compare? Was this what you expected?

a) vertical stretch by 2



b) $y = \left|\frac{1}{2}x\right|$

flip $\frac{1}{2} \to 2 > 1$ horizontal stretch by 2 (x values × 2)

2. List the steps needed in the correct order to graph the following.

   a. $f(x-3)+4$ b. $\frac{1}{2}f(x-3)+7$ * c. $-3f(2x-4)$ d. $\frac{1}{2}f(3x-12)$

a. right 3, up 4

b. vertical compression by $\frac{1}{2}$, right 3, up 7

c. $2 \to \frac{1}{2} < 1$ h. comp.

$-3f(2(x-2))$
- reflection over x-axis
- vertical stretch by 3
- horiz. comp. by $\frac{1}{2}$
- right 2

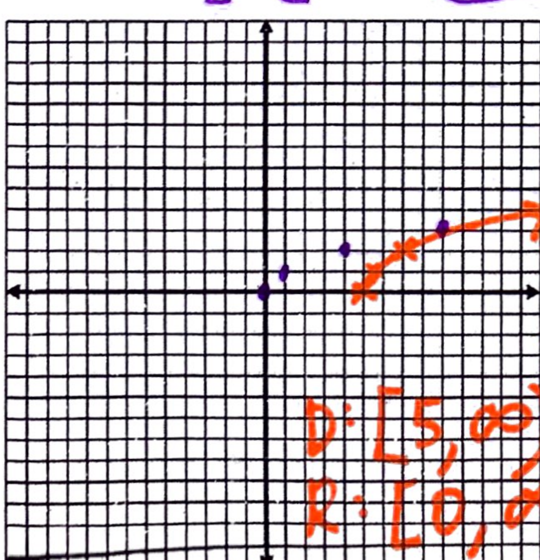
d. $\frac{1}{2}f(3(x-4))$
- vert. comp. $\frac{1}{2}$
- horiz. comp. $\frac{1}{3}$
- right 4

3. Using the toolkit of functions, graph the following. Then state the domain and range of each.

   a. $f(x) = \sqrt{2x-10} = \sqrt{2(x-5)}$ $y = \sqrt{x}$

   $2 \to \frac{1}{2} < 1$ horiz. comp. $\frac{1}{2}$

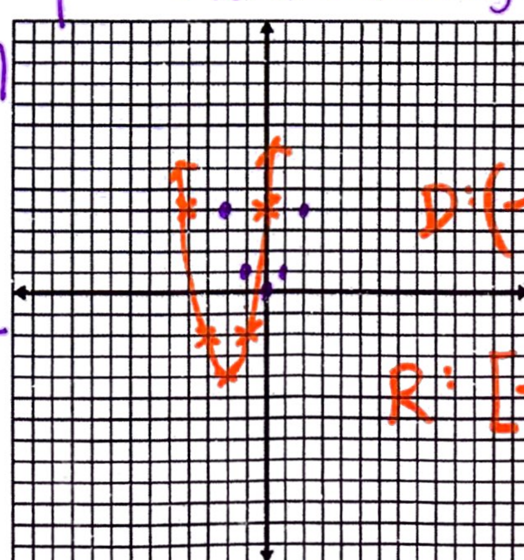
   right 5



D: $[5, \infty)$
R: $[0, \infty)$

   b. $g(x) = 2(x+2)^2 - 4$ $y = x^2$

   - vert. stretch by 2
   - left 2
   - down 4



D: $(-\infty, \infty)$
R: $[-4, \infty)$