Consider the following general equations:
$$y_1 = f(x)$$
$$y_2 = a \cdot f(bx - h) + k$$

y_2 is the image of y_1 after some combination of translations (slides/shifts) $T_{x,y}$ and scale changes (stretch/shrink) $S_{a,b}$.

<u>Vertical Scale Change</u>: a   <u>Vertical Shift</u>: k

<u>Horizontal Scale Change</u>: $\frac{1}{b}$ <u>Horizontal Shift</u>: Solve $bx - h = 0$ for x

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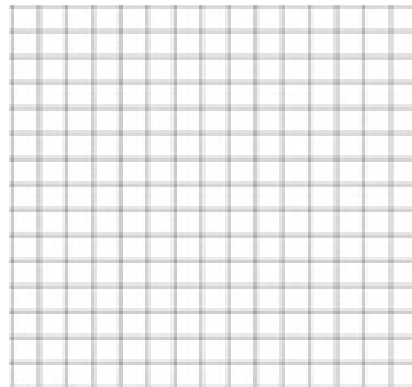Describe the transformation made to the function f in order to get the function g.

1. $f(x) = sin(x)$

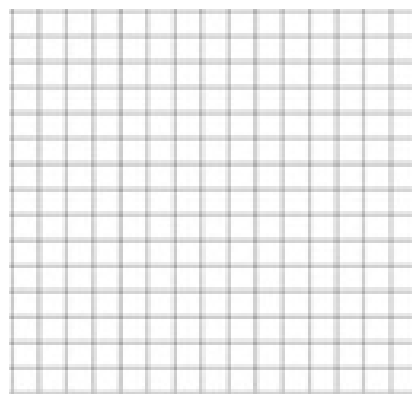 $g(x) = \frac{3}{4}sin(2x - \frac{\pi}{2})$

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

   $g(x) = 8(4x + 3)^4 - 3$

Sketch the graphs of each of the following using known parent functions.
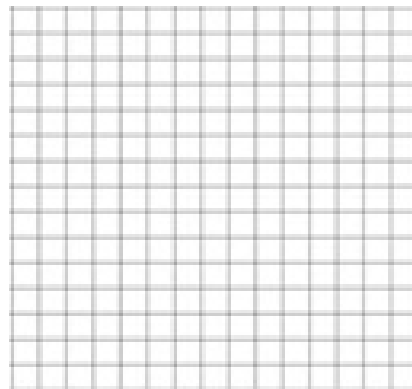
3. $f(x) = (x - 2)^2 - 6$

4. $f(x) = 2|x - 5| + 2$

5. Given that $x^2 + y^2 = r^2$ represents the graph of a circle centered at the origin with a radius of r, sketch the following graph.

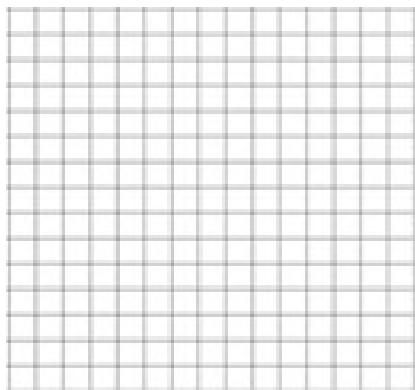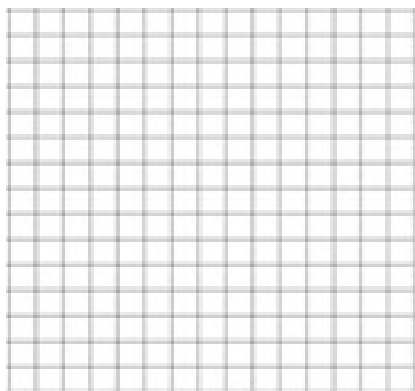$$\left(\frac{x - 2}{4}\right)^2 + \left(\frac{y + 6}{5}\right)^2 = 1$$

Name:_____

Homework

1. Describe the transformation made to the function f in order to get the function g.

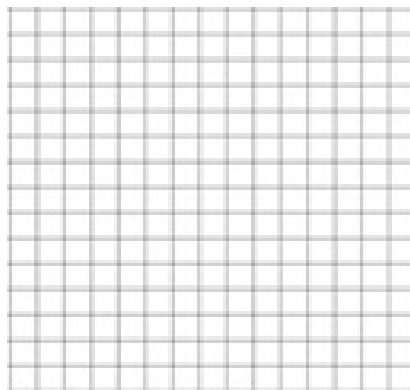|	
a) $f(x) = \|x\|$ $\quad$ $g(x) = 2\|x - 3\| - 1$	b) $f(x) = x^3$ $\quad$ $g(x) = (3x + 6)^3 + 1$
c) $f(x) = sin(x)$ $\quad$ $g(x) = \frac{1}{2}sin(\pi x - \frac{\pi}{2})$	d) $f(x) = 2^x$ $\quad$ $g(x) = 5 + 3 \cdot 2^{2x+8}$

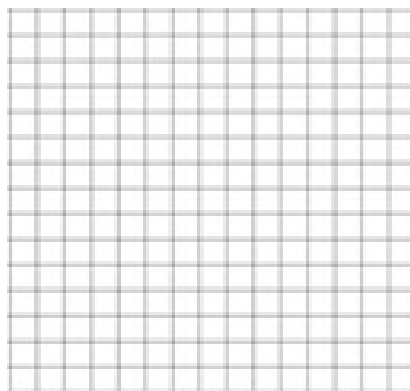2. Sketch the graphs of each of the following, using known parent functions.
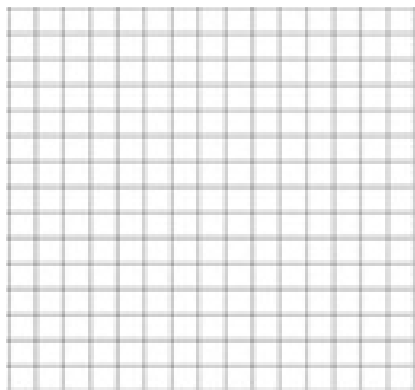
a) $y = (x - 2)^2 - 3$

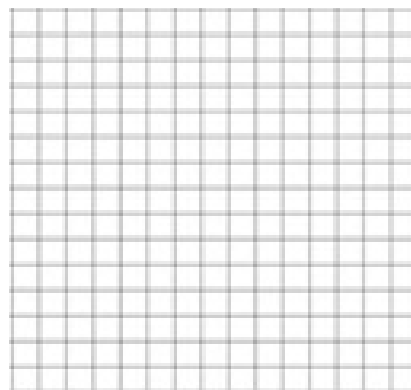b) $y = \frac{1}{2}x^2 - 1$

c) $y = |2x + 6| - 1$

d) $y = -3 + 2\sqrt{x + 1}$

3. Given that $x^2 + y^2 = r^2$ represents the graph of a circle centered at the origin with a radius of r, sketch the following graphs

a) $\left(\frac{x-1}{2}\right)^2 + \left(\frac{y+2}{3}\right)^2 = 1$

b) $\left(\frac{x}{3}\right)^2 + (y-4)^2 = 1$

4. Give an equation for the circle with center (50, 30) and radius 25

5. Explain how the graph of the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$ is related to the graph of the unit circle

6. Give the equation of the function graphed using your knowledge of transformations of circles. Assume that the circle has a radius of 1.