First name: _____ Last name: _____ Student ID: _____

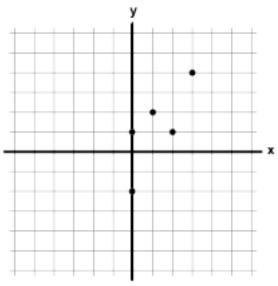
Chapter 3 Transformations of Functions (1) Homework

1. a) State whether each set of ordered pairs represents a function. Explain.
   b) State the domain and the range of the following relations.

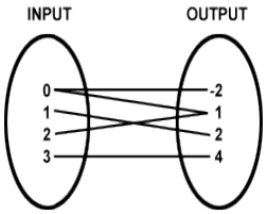
1). {(1, –2), (3, 4), (8, 2), (1, 3), (3, –6)}

2). {(1, 3), (2, 0), (3, –2), (5, 6), (7, 3)}

3).



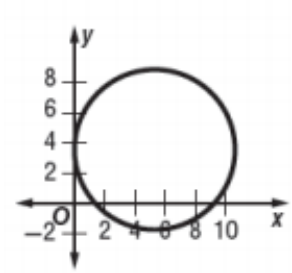
4).



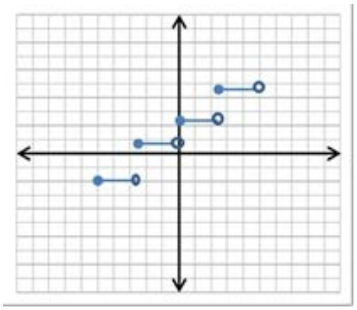
5).

x	y
–3	0
–1	–1
0	0
2	–2
3	4

6).



7).



8) $x = y^2$

2. A ball is thrown upward at 0 s from the ground level, and its height is recorded a number of different times. The ball reaches a maximum height of 9 m after 1.2 s.
   1). Sketch the relation. Time is the independent variable and height is the dependent variable.
   2). State a reasonable domain and range for the relation.
   3). Is this relation a function? Explain.
   4). A student decided to use height as the independent variable and time as the dependent variable. Sketch a graph of this relation.
   5). Is this relation a function, why or why not?

3. Find the domain of each function.

1). $f(x) = \sqrt{2x-5}$ 2). $g(x) = \dfrac{1}{x(x+2)}$ 3). $h(x) = \dfrac{\sqrt{x+5}}{\sqrt{x^2-9}}$

4. Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$	$f(x) = x^2 + 7$	$h(x) = 12/x$
$g(10) =$	$f(3) =$	$h(–2) =$
Find x if $g(x) = 16$	Find x if $f(x) = 23$	
$g(b + 8) =$	$f(h(-3)) =$	

5. Perform the following transformations to the function $y = x^2$.
   a). a translation to the right by 2 units.
   b). a translation to the left by 2 units.
   c). a translation upward by 2 units.
   d). a translation downward by 2 units.
   e). a reflection through the y axis.
   f). a reflection through the x axis.

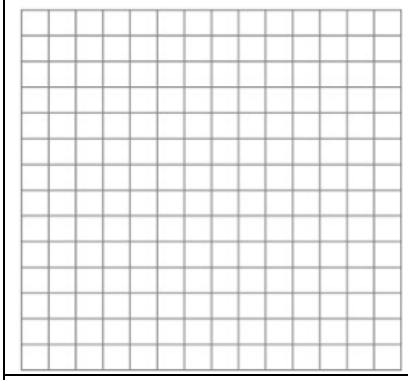
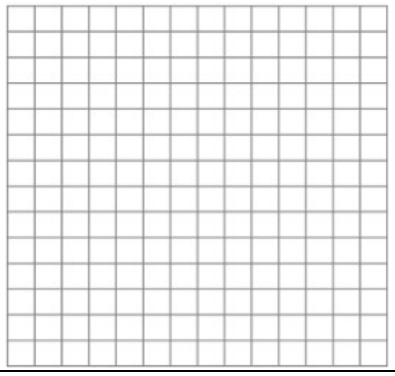
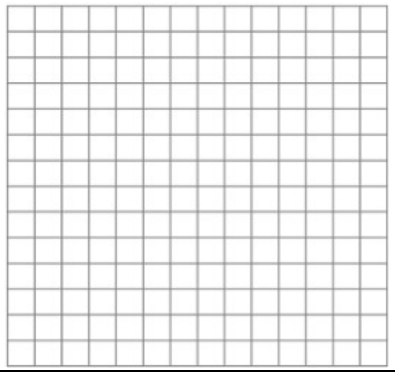
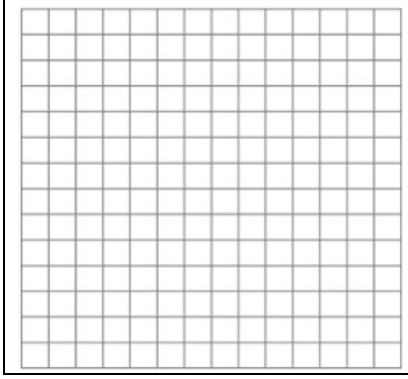
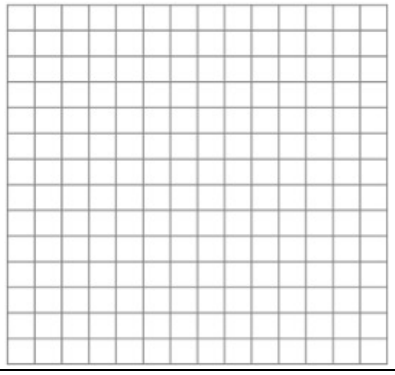
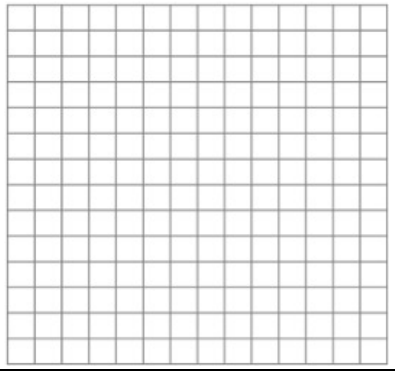
In each case, **write the function** that gives the requested transformation and **draw the graph** of the transformed function.

a) y =	b) y =	c) y =

d) y = 	e) y = 	f) y = 

6. Repeat the above exercise for the functions y = $\sqrt{x}$, y = |x|, and y = 1/x.

y = $\sqrt{x}$

a) y = 	b) y = 	c) y = 
d) y = 	e) y = 	f) y = 

y = |x|

a) y =	b) y =	c) y =
d) y =	e) y =	f) y =

y = 1/x – Please label the asymptotes.

a) y =	b) y =	c) y =

d) y =	e) y =	f) y =
		

7. In the exercises that follow, fill in the blanks. The first exercise is done as an example.

   1). To obtain the graph of y = |x + 3|, we translate the graph of y = |x| to the left by 3 units.

   2). To obtain the graph of y = − |x|, we _____ the graph of y = |x| _____.

   3). To obtain the graph of y = − x + 5, we _____ the graph of y = x _____ and

   _____.

   4). To obtain the graph of _____, we stretch the graph of y = 1/x vertically by a factor of 3.

8. Identify the parent function and describe the transformations. Then, perform a sequence of transformations to obtain the graph of each of the following functions.

1). $y = 3(x - 1)^2 + 2$

Parent Function:

Transformation:

2). $y = -\sqrt{3x}$

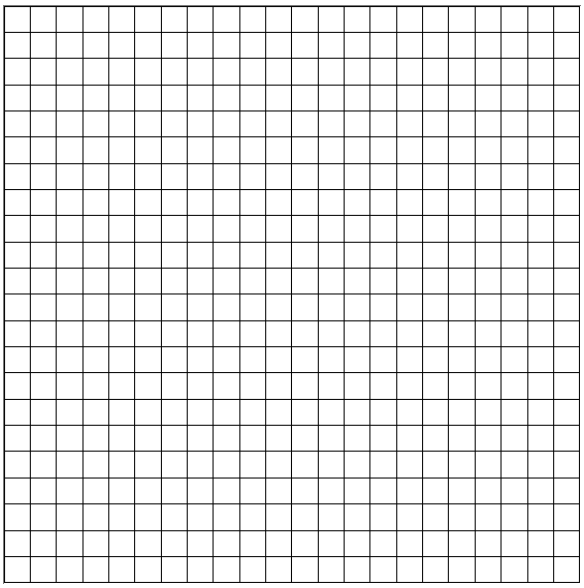
Parent Function:

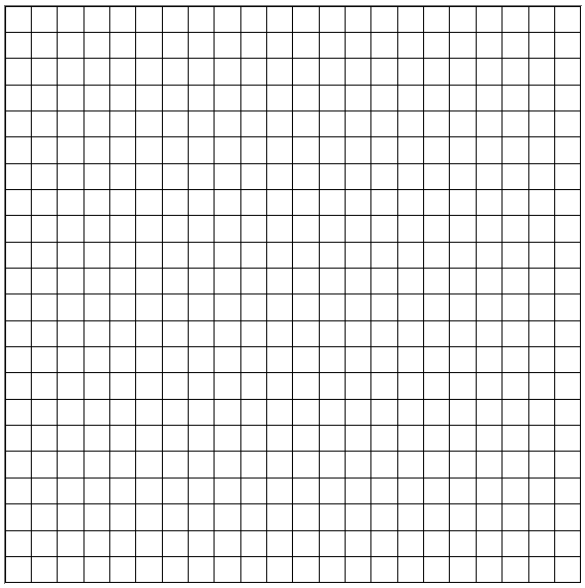
Transformation:

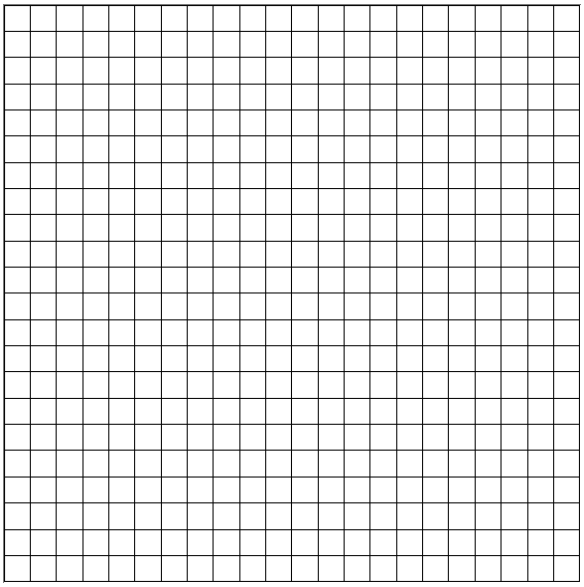
3). $y = \frac{1}{x+4} - 1$

Parent Function:

Transformation:







9. Given $f(x) + 2g(x) = 12x^2 + 3x + 8$ and $2f(x) + 3g(x) = 18x^2 + 6x + 13$
   Find the value of $f(2) + g(3)$.