

## Good morning!

- Park your phones
- Grab your calculators
- Take out HW and stamp sheet  
(boat activity)



## Announcements

Quiz tomorrow (Tuesday)

Progress reports tomorrow

New Lunch schedule: 10:57-11:22

Unit 3 Test - Friday

Function Transformations Notes Name: \_\_\_\_\_ Date: \_\_\_\_\_ H

Warm Up

1. An isosceles right triangle is placed on a coordinate grid. One of its legs is on the x-axis and the other on the y-axis. Which described the shape created when the triangle is rotated 360 degrees about the x-axis?

Isos  $\Rightarrow$  base & 2 sides  $\parallel \parallel$

Cone!

2. Which transformation will **always** produce a congruent figure?

Same Size "Measure"

- a)  $(x', y') = (x + 4, y - 3)$
- b)  $(x', y') = (2y, y)$
- c)  $(x', y') = (x + 2, 2y)$
- d)  $(x', y') = (4x, 4y)$

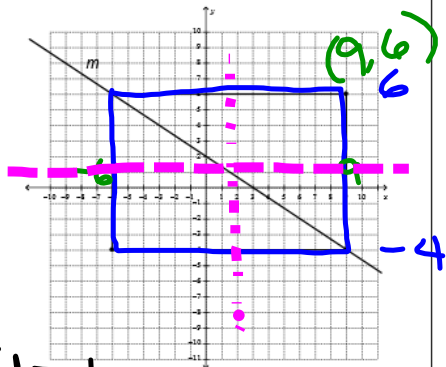
Dilation  
do not preserve isometry

3. Which of the following rules is the combination of a dilation of scale factor 2 following a translation of three units to the right?

- a)  $(2x+3, y)$
- b)  $(2x+6, 2y)$
- c)  $(2x+3, 2y)$
- d)  $(2x+6, y)$

$(x, y) \rightarrow (x+3, y)$   
 $(x+3, y) \rightarrow 2(x+3, y)$   
 $(2x+6, 2y)$

4. Name a transformation that will carry the figure onto itself.



$y = 1$   
and  
 $x = 2$

**Objectives:** How are function transformations the same as geometric transformations? How are they different? How do you move a function left or right? How do you move a function up or down?

Function Transformations Notes Name: \_\_\_\_\_ Date: 10/2/17 H

## Function Transformations

### Function Translation Discovery – use graphing calculators

For each of the following, graph part (a) first then graph part (b) and (c) in the same window. Use the standard viewing window to make the graphs. Let  $f(x) = x^2$  and  $g(x) = \sqrt{x}$ .

Quad

Square Root

outside ( )'s

Graph	Formula	Observations
1. a) $y = f(x)$	$y = (x)^2$	parent function (0,0) vertex
b) $y = f(x) + 3$	$y = (x)^2 + 3$	moved graph up 3 (0,3) vertex
c) $y = f(x) - 3$	$y = (x)^2 - 3$	moved graph down 3 (0,-3)
2. a) $y = g(x)$	$y = \sqrt{(x)}$	Parent function (0,0)
b) $y = g(x) + 3$	$y = \sqrt{(x)} + 3$	moved up 3 vertex (0,3)
c) $y = g(x) - 3$	$y = \sqrt{(x)} - 3$	moved down (0,-3)

**Predictions:** Let  $h$  be a function. How does the graph of  $y = h(x) + c$  compare to the graph of  $y = h(x)$  if  
 a)  $c > 0$   
 b)  $c < 0$

outside ( )  
 is  $c > 0$   
 moves graph  
 up "c"  
 units  
 Translation.

outside ( )  
 $c < 0$  (negative)  
 moved graph  
 down "c"  
 units  
 Translations  
 (check your range)



Function Transformations Notes Name: \_\_\_\_\_ Date: \_\_\_\_\_ H

For each of the following, graph part (a) first then graph part (b) and (c) in the same window. Use the standard viewing window to make the graphs. Let  $f(x) = \sqrt{x}$

Graph	Formula	Observations
1. a) $y = f(x)$	$y = \sqrt{x}$	parent functions
b) $y = -f(x)$	$y = -\sqrt{x}$	Reflection over x-axis
2. a) $y = f(x)$	$y = \sqrt{x}$	parent functions
b) $y = f(-x)$	$y = \sqrt{-x}$	Reflection over y-axis

In Summary

$f(-x)$  reflection y-axis

Inside the ( ) or  $\sqrt{\quad}$  symbol

$-f(x)$  reflection x-axis

Outside the ( ) or  $\sqrt{\quad}$  symbol

How do transformations change the domain and/or range???

check both domain or range!

**Objectives:** How are function transformations the same as geometric transformations? How are they different? How do you move a function left or right? How do you move a function up or down?

\* Same? shape doesn't change size

\* Different? didn't use arrow  $\rightarrow$  notation used "  $f(x)$  " notation

\* L/R add/subtract "inside" ( ),  $\sqrt{\quad}$ , | | ,

\* up/down add/subtract "outside"  $\uparrow \downarrow$

Function Transformations Practice

Name: \_\_\_\_\_

Date: 10/2/17

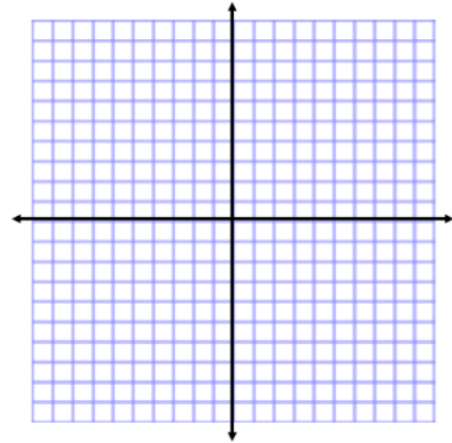
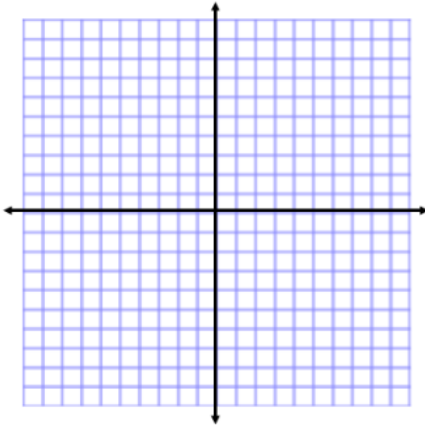
For problem 1- 4, please give the name of the parent function and describe the transformation represented. You may use your graphing calculator to compare & sketch. Identify the domain and range of the function.

1.  $g(x) = x^2 - 1$  Parent: Quadratic

2.  $f(x) = x + 2$  Parent: \_\_\_\_\_

Transformations: \_\_\_\_\_

Transformations: \_\_\_\_\_

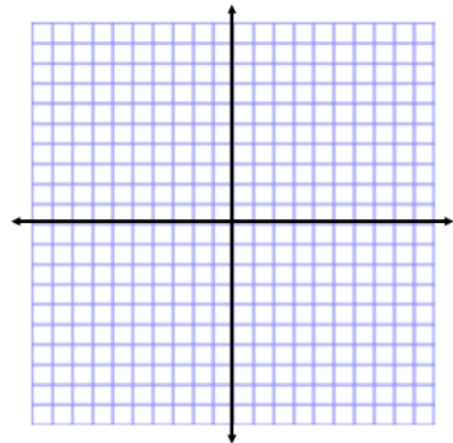
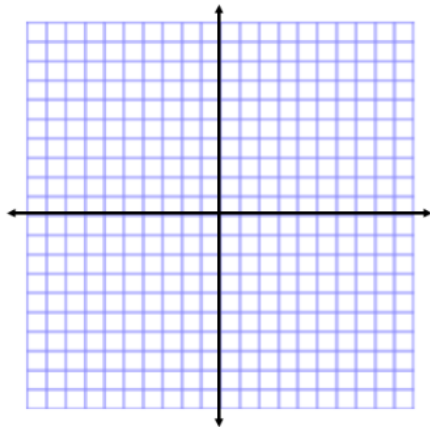


3.  $h(x) = -|x + 3| - 2$  Parent: \_\_\_\_\_

4.  $g(x) = (x+1)^2 + 3$  Parent: \_\_\_\_\_

Transformations: \_\_\_\_\_

Transformations: \_\_\_\_\_

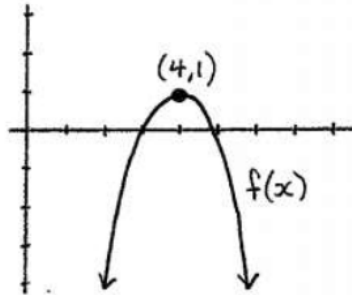


5. Write an equation that will move the graph of the function  $y = x^2$  right 4 units.

6. Write an equation that will move the graph of the function  $y = x^2$  down 7 units.

7. Write an equation that will move the graph of the function  $y = x^2$  left 2 units and up 6 units.

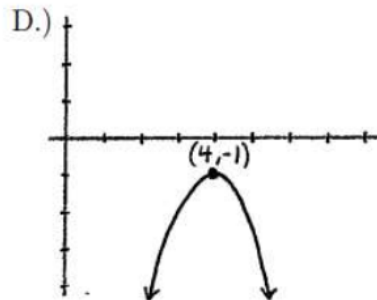
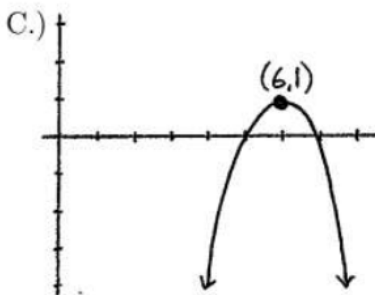
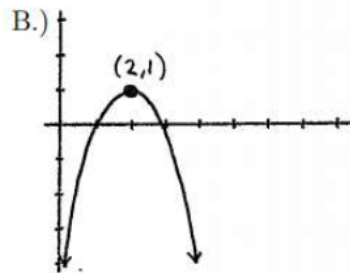
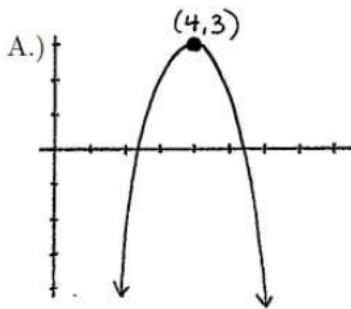
Function Transformations Practice Name: \_\_\_\_\_ Date: \_\_\_\_\_



Given the graph of  $f(x)$  above, match the following four functions with their graphs.

- 13.)  $f(x) + 2$       14.)  $f(x) - 2$       15.)  $f(x + 2)$       16.)  $f(x - 2)$

A





Function Transformations Practice Name: \_\_\_\_\_ Date: \_\_\_\_\_

**# 1- 5 Give the name of the parent function and describe the transformation represented.**

1.  $g(x) = x^2 - 1$  Name:  
Transformation:

2.  $f(x) = |x - 3| - 4$  Name:  
Transformations:

3.  $h(x) = -\sqrt{x-2}$  Name:  
Transformations:

4.  $g(x) = -x^3 + 3$  Name:  
Transformations:

5.  $f(x) = |x + 5| - 2$  Name:  
Transformations:

**#6-8 Identify the domain and range of the function. Describe the transformation from its parent function.**

6.  $g(x) = \sqrt{x} + 5$  Domain :                      Range :  
Transformations:

7.  $h(x) = -x^2 + 1$  Domain :                      Range :  
Transformations:

10.  $h(x) = -|x - 2|$  Domain :                      Range :  
Transformations:

**Build me a function:**

+ Absolute value function that shifts left 2, up 5 and reflects over the x-axis

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

+ Quadratic function that shifts right 3, down 4, and reflects over the y-axis

$$g(x) = (-x - 3)^2 - 4$$

