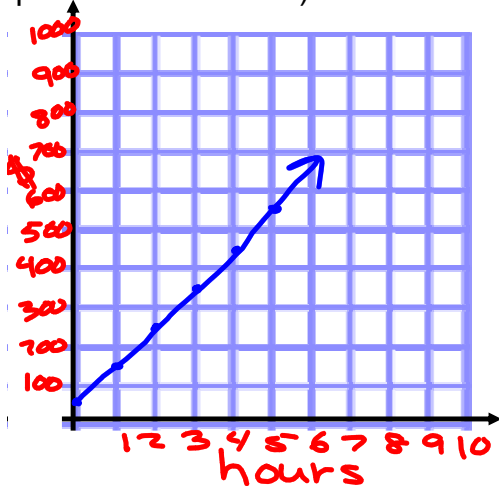# Warm-Up 9/6

Create a graph to represent the following situation and answer the questions.

1. Jerry owns a mechanic shop. He charges an inspection fee plus $100 per hour that any of his guys work on a vehicle. (His shop is unique and the charge is prorated for portions of an hour.)

A. Is the function discrete or (continuous)? Why?

He charges for portions of an hour.

B. Is the function (linear) or exponential? How do you know?

There is a constant fee per hour.

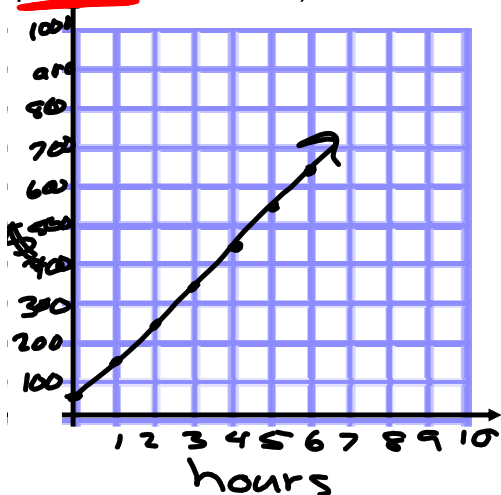C. Graph the function. Be sure to label your x- and y-axis.

D. Which equation is representative of this situation?

$y = 50x + 100$ $\boxed{y = 100x + 50}$

$y = 100^x + 50$ $y = 100/x + 50$

1

Warm-Up 9/6

Create a graph to represent the following situation and answer the questions.

1. Jerry owns a mechanic shop. He charges an inspection fee plus $100 per hour that any of his guys work on a vehicle. (His shop is unique and the charge is prorated for portions of an hour.)

A. Is the function discrete or continuous? Why?

You can charge for portions of an hour

B. Is the function linear or exponential? How do you know?

Constant increase (rate of change)

C. Graph the function. Be sure to label your x- and y-axis.

1000 900 800 700 600 500 400 350 200 100

1 2 3 4 5 6 7 8 9 10

hours

D. Which equation is representative of this situation?

y = 50x + 100   y = 100x + 50

$y = 100^x + 50$ y = 100/x + 50

Quiz

Today's Goal

I can...
- transform functions

If you change the input (domain)...

New Function	Points	Graphically
f(x + d)	(x, y) to (x - d, y)	left d spaces
f(x - d)	(x, y) to (x + d, y)	right d spaces

If you change the output (range)...

New Function	Points	Graph
f(x) + d	(x, y) to (x, y + d)	up d spaces
f(x) - d	(x, y) to (x, y - d)	down d spaces
cf(x)	(x, y) to (x, cy)	stretch vertically by c
$\frac{1}{c}$ f(x)	(x, y) to (x, $\frac{1}{c}$y)	shrink vertically by c

Given the following graph that represents $f(x)$, find the graph that corresponds to the expression for the transformed function. Tape the corresponding graph in the space with its transformed function.

$f(x-2)$

right 2 spaces

$-f(x)$
flips
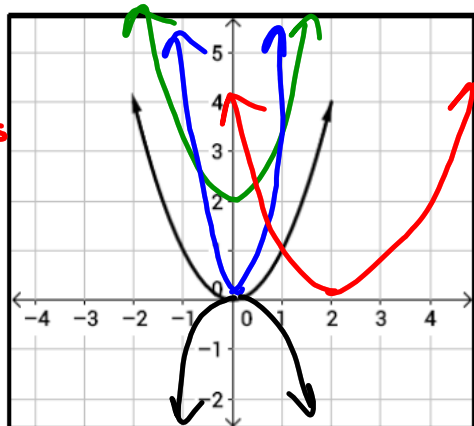
$f(x) +2$
up 2 spaces

$3f(x)$
stretch by 3

Given the following table that represents $f(x)$, find the table that corresponds to the expression for the transformed function. Tape the corresponding function in the square with its transformed function.

$\frac{1}{2}f(x)$ fat/wide

x	$\frac{1}{2}f(x)$
-2	2
-1	½
0	0
1	½
2	2

$f(x) - 1$ down 1

x	$f(x)-1$
-2	3
-1	0
0	-1
1	0
2	3

x	$f(x)$
-2	4
-1	1
0	0
1	1
2	4

$f(x+1)$

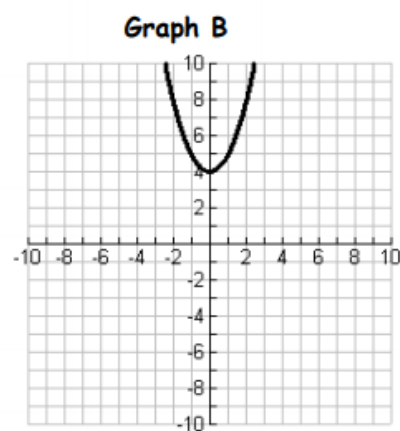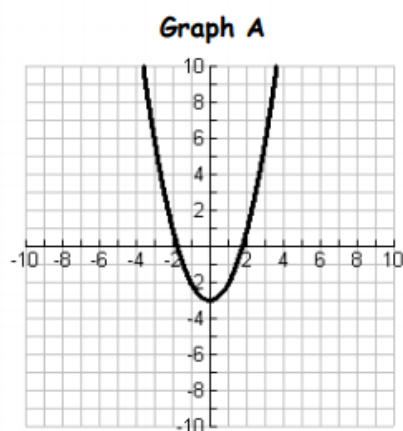| $(x+1)$	$f(x+1)$
-3	4
-2	1
-1	0
0	1
1	4

8

$f(x) = 4x + 2$ $g(x) = 4x - 3$

$h(x) = 4(x - 2) + 2$

$$f(x) = 3x^2 + 2 \qquad\qquad g(x) = 3x^2 - 5$$

10) The equation $y = x^2 - 3$ is graphed below on **Graph A**. Write the equation graphed on **Graph B**.

Graph A

Graph B

Equation of function in **Graph B** _____

1)   Describe how the following two functions would compare to each other:

   $y = 4x + 2$ $y = 4x - 1$

                                                           Function name _____

   _____

3)   Describe how the following two functions would compare to each other:

   $y = 2^x - 4$ $y = -2^x + 3$

                                                           Function name _____

   _____

4) Write a function that is shifted 2 units up from the function $f(x) = |x| + 3$.

_____

5) Write a function that is shifted 4 units down from the function $f(x) = |x - 3| + 1$.

_____

12) Use the two given functions to choose the best statement comparing their graphs.

   Function 1: $y = 5x^2$ Function 2: $y = 5x^2 - 8$

   A. Function 2's graph is shifted up 8 units from Function 1's graph.
   B. Function 2's graph is shifted down 8 units from Function 1's graph.
   C. Function 2's graph reflected from Function 1's graph.
   D. Function 2's graph is shifted right 8 units from Function 1's graph.

13) Use the two given functions to choose the best statement comparing their graphs.

   Function 1: $y = -3^x + 4$ Function 2: $y = -3^x - 2$

   A. Function 2's graph is shifted up 6 units from Function 1's graph.
   B. Function 2's graph reflected from Function 1's graph.
   C. Function 2's graph is shifted left 6 units from Function 1's graph.
   D. Function 2's graph is shifted down 6 units from Function 1's graph.

Group Transformation Activity

Review:

Quiz 1.1-1.2: Functions and Graphing

Name:_____

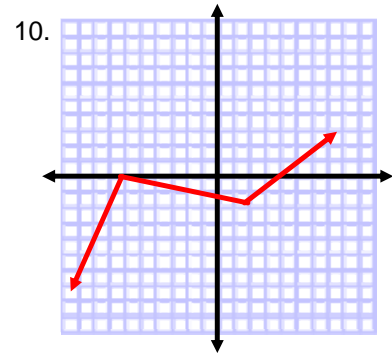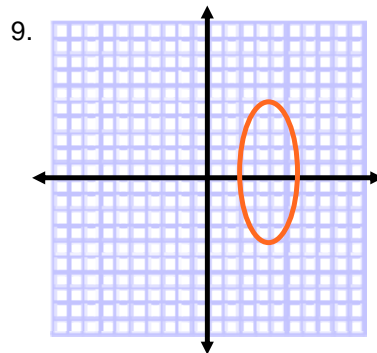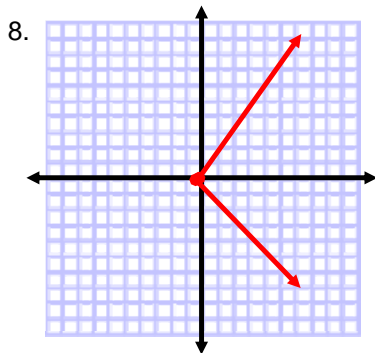**Short Answer. Write the Vocabulary word that best fits the sentence.**

1. A function is a relation that each input has exactly _____ output.

2. The independent variable is the variable whose value is _____ on the other variable.

Given x = 3 solve the following functions for the value. Circle your answers.

3. g(x) = 2x - 5   4. h(x) = -x + 8

Determine if the following are functions. Circle your answers.

8.   9.   10.

Determine if the following relations are functions. Explain why or why not.

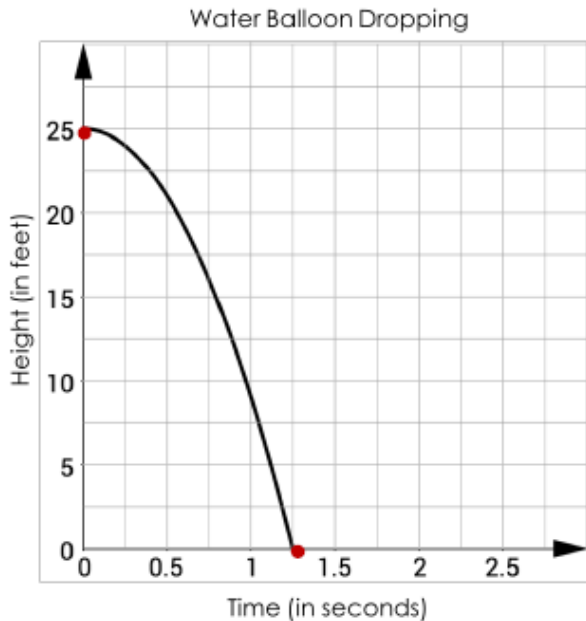11. (2, -4), (3, -6), (4, -8), (5, -10), (2, 5)

12. (0, 5), (1, 6), (2, 7), (3, 8)

Quiz 1.2: Key parts of a graph

Name:_____ Period:_____

Use the following situation to answer the questions.

Consider the following graph that represents the height, in
feet, of a water balloon dropped from a 2ⁿᵈ story window
after a given number of seconds.

Water Balloon Dropping

A. Is the graph increasing or decreasing? Why?

B. What is the x-intercept and what does it represent?

C. What is the y-intercept and what does it represent?

D. What is the maximum and what does it represent?

E. Are there any key parts of the graph that are the same? If so, which ones?
(maximum, minimum, x-intercept, and y-intercept)

Quiz 1.3: Real World Graphs

Name:_____

Use the situations to answer the questions.

1. Contagious Virus

Contagious Virus

a) Is this graph going to be discrete or continuous? Why?

A few people come into a town and are carriers of a contagious virus. The virus spreads and every day the number of people carrying the virus triples. There is no end in sight for the virus.

x = The number of days since the carriers came into town.

b) Is this graph going to be linear or exponential? How do you know?

y = The number of people carrying the virus.
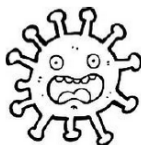
c) Which equation would match this situation?

$$a) y = \frac{10}{x} \qquad c) y = 10(3^x)$$

d) How many people initially came into town carrying the virus?

$$b) y = 15 + 50x \qquad d) y = \frac{1}{8}(2)^x$$

2. Computer Repair

Computer Repair

a) Is this graph going to be discrete or continuous? Why?

PC Squad charges a fixed fee to come to you home and repair your computer. They charge an additional hourly rate for the time they work on the computer. (The amount is prorated for portions of an hour. Also, there is a maximum charge.)

b) Is this graph going to be linear or exponential? How do you know?

x = The time, in hours, the repairman spends working on the computer.

y = The total cost, in dollars, for the repairman's time in dollars.

c) How much is the hourly rate? Use the equations on the other page to answer this question.

3. Sketch the graph of one of the situations. Be sure to label your x- and y- axis.

Homework

Transformations Worksheet: Problems 1-5 on the front and 1-8 on the back.