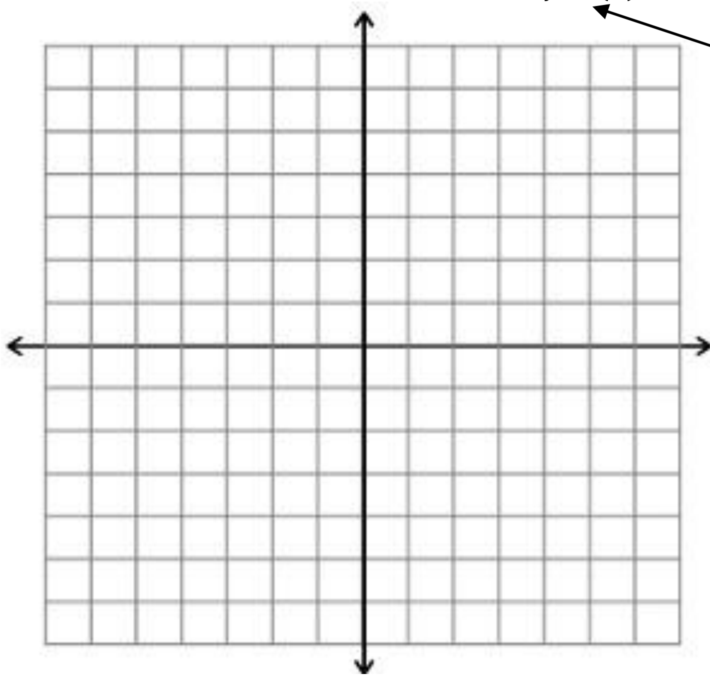
Name: Date: Period:

Math Lab: Exploring Inverses of Functions Graphically

1] Without a graphing calculator and using a pencil, accurately sketch each function on the same plot below labeling the coordinates of at least 3 points.

$f(x) = \sqrt[3]{x} + 2$ $f^{-1}(x) = (x-2)^3$



The notation $f^{-1}(x)$ means "the inverse of $f(x)$" and does not change how you graph the function.

2] With your pencil, trace both graphs onto your tracing paper. Notice these images look to be symmetrical; fold your tracing paper along the line of symmetry. What is the equation for the line of symmetry?

3] List 3 coordinates on each graph in the tables below. What do you observe about the relationship between the x- and y- values on the function and its inverse?

$f(x)$

x	y

$f^{-1}(x)$

x	y

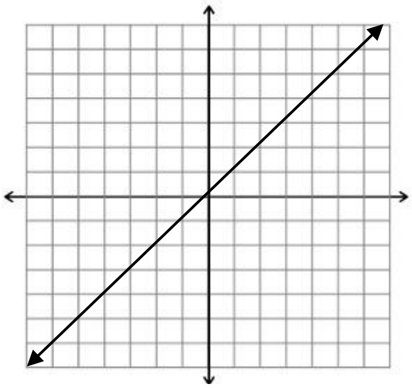
4] Summarize

- Functions are inverses of each other if they have symmetry over the line _______________.
- The inverse of a function switches the ____ and ____ coordinates; this means that the ______________ of the function becomes the _______________ of its inverse and the ________________ of the function becomes the ______________ of its inverse.

Determine if each pair of functions are inverses of each other by sketching a graph without a calculator.

5] $f(x) = 2x + 4$

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

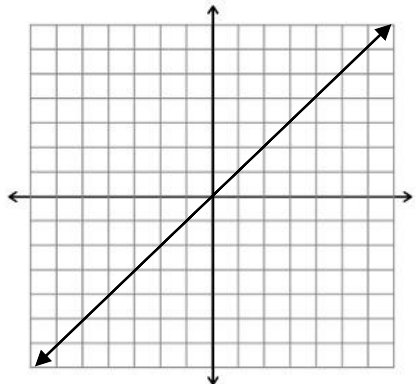


Inverses – yes or no (circle one)

Explain:

6] $f(x) = \sqrt[3]{x - 5}$

$g(x) = x^3 + 5$

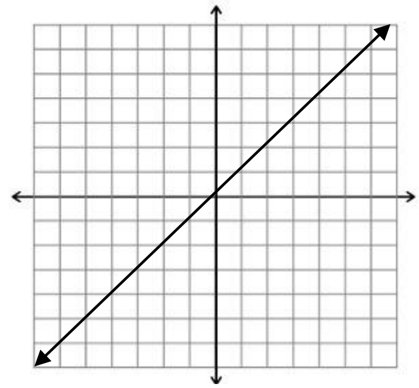


Inverses – yes or no (circle one)

Explain:

7] $f(x) = \frac{1}{x+3}$ (dash in the V.A.)

$g(x) = \frac{1}{x} - 3$ (dash in the H.A.)



Inverses – yes or no (circle one)

Explain:

Determine if each pair of functions are inverses of each other by testing 3 ordered pairs.

EXAMPLE: $f(x) = 3x - 6$ and $g(x) = \frac{1}{3}x + 2$

Take your y-values and use them as the new x-values in the other function.

f(x)

x	y

g(x)

x	y

Find 3 ordered pairs on the function to put here. Be sure to use one (+) and one (-) x-value and 0.

Inverses – yes or no (circle one)

Explain:

8] $f(x) = 2x - 8$

$g(x) = \frac{1}{2}x + 4$

f(x)

x	y

g(x)

x	y

Inverses – yes or no (circle one)

Explain:

9] $f(x) = x^2 + 4$

$g(x) = \sqrt{x - 4}$

f(x)

x	y

g(x)

x	y

Inverses – yes or no (circle one)

Explain:

10] $f(x) = |x| + 2$

$g(x) = x - 2$

f(x)

x	y

g(x)

x	y

Inverses – yes or no (circle one)

Explain: