Algebra 1R – Mr. Bo
Unit 5 – Day 4 Notes

Name:_____
Date:_____

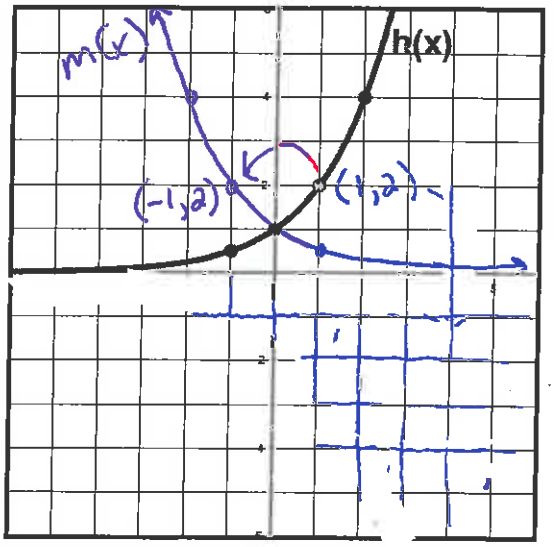
Reflections of Linear & Exponential Functions

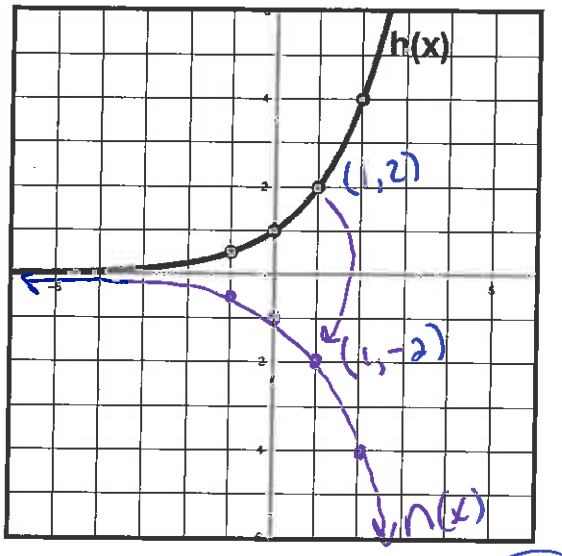
PROBLEM 1 Reflections

Transformation: The mapping, or movement, of all points of a figure in a plane according to a common operation.

Reflection: A type of *transformation* that flips an entire graph over a **line of reflection** to create a mirror image.

1. Consider the graph of a function h(x) on the two grids below.





a. On the left grid, graph the function, m(x), where m(x) is the reflection of h(x) over the line x = 0. Describe how each point on h(x) changed to produce the graph of m(x).

the x-coordinate changed sign.
the y-coordinate did not change.

y-axis

b. Write the function m(x) in terms of h(x). Explain the change made to h(x) to produce m(x).

$m(x) = h(-x)$

the x is made negative because the x-coord must change sign.

c. If $h(x) = 2^x$, then rewrite m(x) in terms of x.

$m(x) = h(-x)$
$= 2^{-x}$

d. On the right grid, graph the function, n(x), where n(x) is the reflection of h(x) over the line y = 0. Describe how each point on h(x) changed to produce the graph of n(x).

x-axis.

the y-coordinate changed sign,

the x-coordinate did not change.

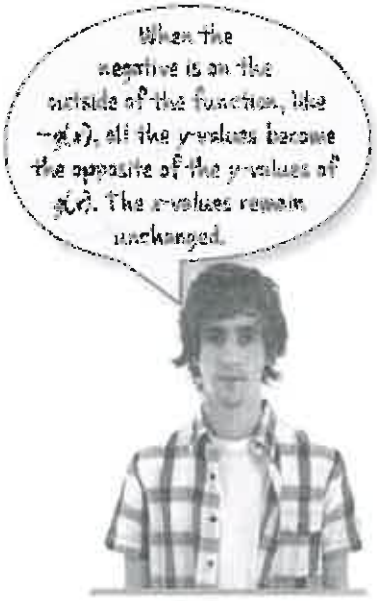
e. Write the function n(x) in terms of h(x). Explain the change made to h(x) to produce n(x).

$n(x) = -h(x)$ made h(x) negative because the y-coord must change signs.

f. If $h(x) = 2^x$, then rewrite n(x) in terms of x.

$n(x) = -h(x)$

$= -(2^x)$



2. For each function, describe the transformation to the function s(x).

a. h(x) = -s(x) h(x) is S(x) reflected over the x-axis (y=0)

b. j(x) = s(-x) j(x) = S(x) reflected over the y-axis (x=0)

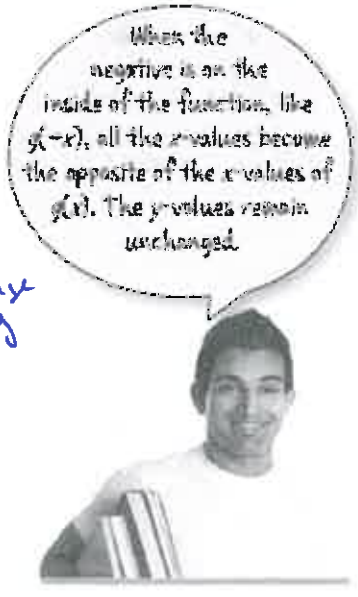
3. Write each function in terms of the function, f(x), where $f(x) = 4^x$.

a. $p(x) = -(4^x)$

$p(x) = -f(x)$

b. $p(x) = 4^{-x}$

$p(x) = f(-x)$

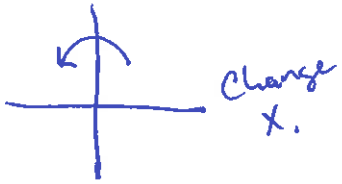


c. b(x) is f(x) reflected over y = 0. ← x-axis

$b(x) = -f(x)$

d. c(x) is f(x) reflected over x = 0. ← y-axis

$c(x) = f(-x)$



Check For Understanding:

Complete the table by describing the transformation of the graph of the basic function.

Function	Description of Transformation of Graph
$f(x) = -(5x)$	Graph of 5^x is reflected over the x-axis
$f(x) = 3(4^{-x})$	graph of $3(4^x)$ is reflected over the y-axis.
$f(-x)$	$f(x)$ is reflected over y-axis.
$-f(x)$	$f(x)$ is reflected over ~~x~~-axis

Be prepared to share your answers.