Assignment

Write

Given a basic function and the equation for a reflection of a basic function, explain how to determine whether the line of reflection will be the x-axis or the y-axis.

Remember

Transformations performed on any function $f(x)$ can be described by the transformation function $g(x) = Af(x - C) + D$ where the D-value translates the function $f(x)$ vertically, the C-value translates $f(x)$ horizontally, and the A-value vertically stretches or compresses $f(x)$.

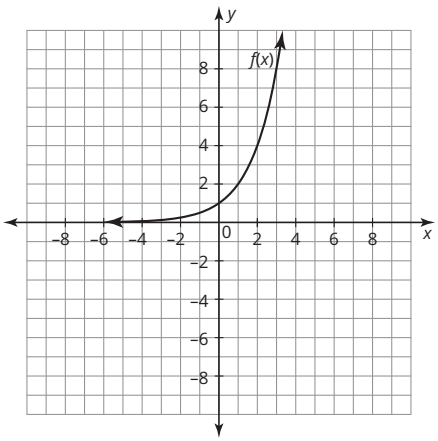
Practice

1. Complete the table to determine the corresponding points on $c(x)$, given reference points on $f(x)$. Then, graph $c(x)$ on the same coordinate plane as $f(x)$ and state the domain, range, and asymptotes of $c(x)$.

   a. $f(x) = 2^x$

   $c(x) = f(x - 1)$

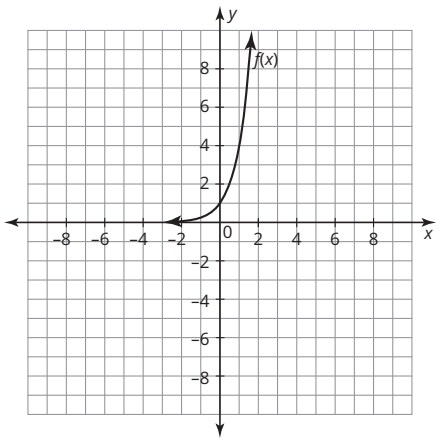
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{2}\right)$	
(0, 1)	
(1, 2)	



   b. $f(x) = 4^x$

   $c(x) = -f(x) - 2$

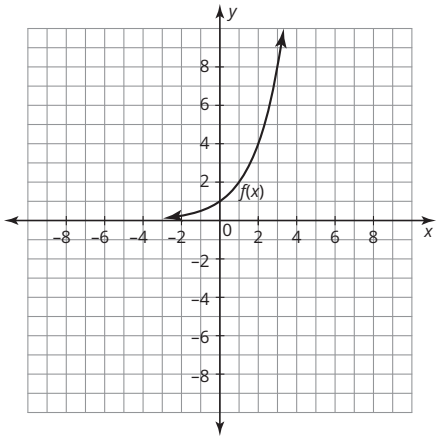
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{4}\right)$	
(0, 1)	
(1, 4)	



c. $f(x) = 2^x$

$c(x) = 4f(x)$

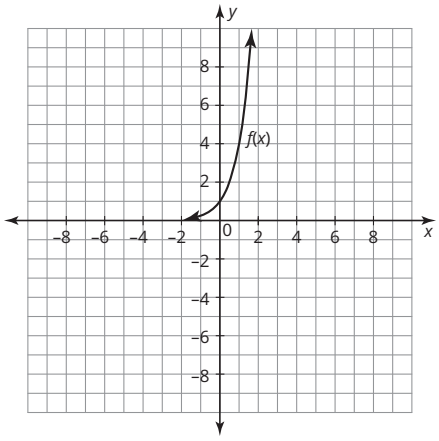
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{2}\right)$	
(0, 1)	
(1, 2)	



d. $f(x) = 4^x$

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

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{4}\right)$	
(0, 1)	
(1, 4)	



2. Describe the transformations performed on $m(x)$ that produced $t(x)$. Then, write an exponential equation for $t(x)$.

a. $m(x) = 3^x$

$t(x) = -m(x + 1)$

b. $m(x) = 5^x$

$t(x) = 3m(x) - 2$

c. $m(x) = 4^x$

$t(x) = m(x - 1)$

d. $m(x) = 7^x$

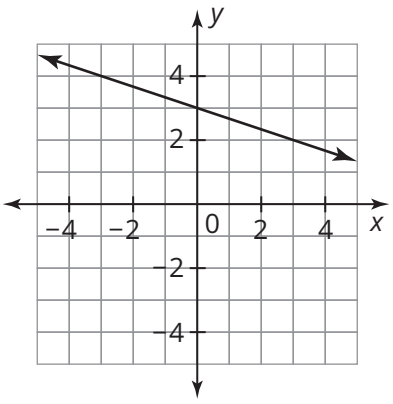
$t(x) = m(x) + 2$

Stretch

Research real-world examples for which exponential functions provide good models. Write a short paragraph explaining why an exponential model works well for at least one of the examples.

Review

1. Given $f(x) = x$, write $m(x)$ in terms of a transformation of $f(x)$.



2. Solve each equation.

   a. $2^{x+1} = 64$

   b. $4^x = 64$

3. Determine the location of a point labeled G on the coordinate plane such that the figure $DEFG$ is a square. Justify your reasoning.