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 $g(x) = Af(B(x - C)) + D$ where the D-value translates the function $f(x)$ vertically, the C-value translates $f(x)$ horizontally, the A-value vertically stretches or compresses $f(x)$, and the B-value horizontally stretches or compresses $f(x)$.

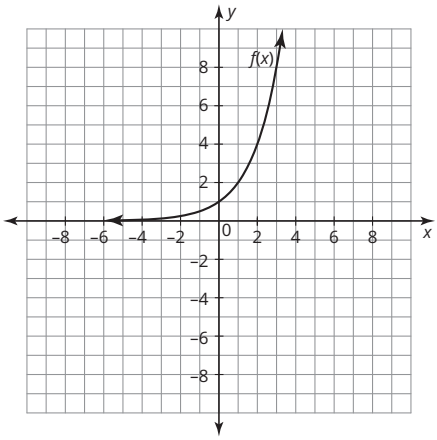
Practice

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. $f(x) = 2^x$

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

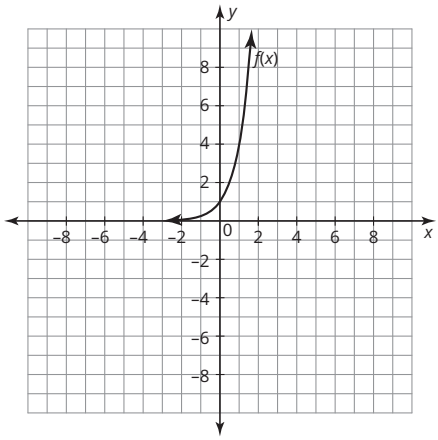
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{2}\right)$	
(0, 1)	
(1, 2)	



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

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

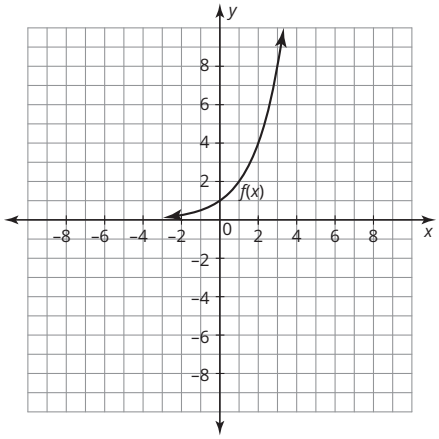
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{4}\right)$	
(0, 1)	
(1, 4)	



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

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

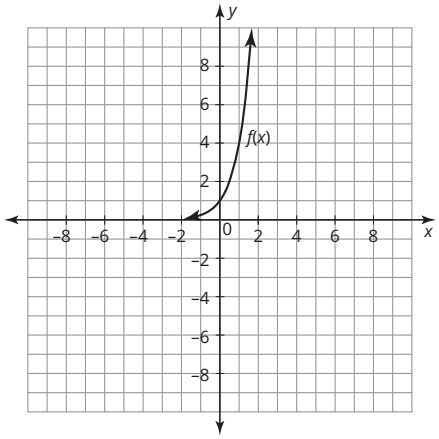
Reference Points on $f(x)$	Corresponding Points on $c(x)$
$\left(-1, \frac{1}{2}\right)$	
(0, 1)	
(1, 2)	



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. $m(x) = 5^x$

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

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

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

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. Rewrite each expression using properties of powers. Write the simplified expression in radical form.

   a. $(\sqrt{2})^3 \sqrt[3]{2}$ b. $\frac{(\sqrt[3]{3})^2}{\sqrt[4]{3}}$

2. Solve each linear absolute value equation. Show your work.

   a. $6 - 7|x - 4| = -36$ b. $-8|-10x| + 1 = -79$

3. Graph the piecewise function.

$$f(x) = \begin{cases} x + 2, -5 < x \leq -1 \\ y = 1, -1 < x < 3 \\ -x + 4, 3 \leq x < 5 \end{cases}$$

4. Write a piecewise function to model the transformed absolute value function shown.