

### 12.3 Skills Practice: I Like to Move It Transformations of Exponential Functions

#### Problem Set

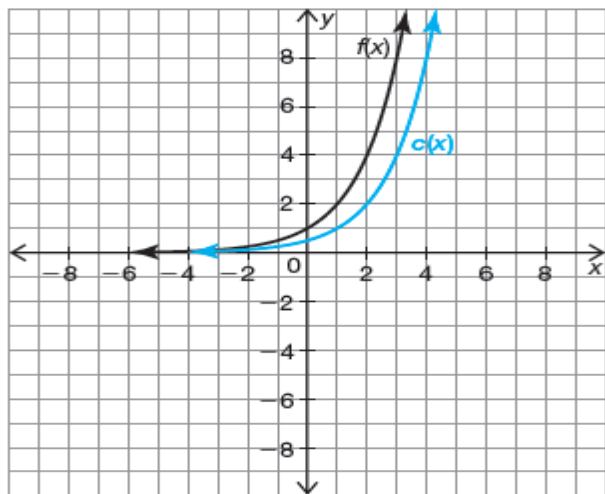
Complete the table to determine the corresponding points on  $c(x)$ , given reference points on  $f(x)$ . Then, graph  $c(x)$  on the same coordinate plane as  $f(x)$  and state the domain, range, and asymptotes of  $c(x)$ , write the function for the transformed  $c(x)$  and state the end behavior using limit notation.

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

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

$(x+1, y)$

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



Domain: All Real Numbers;  $(-\infty, \infty)$

Range: All real numbers greater than 0;  $y > 0$

Horizontal asymptote:  $y = 0$

Transformed function:  $c(x) = 2^{x-1}$

End Behavior:

$\lim_{x \rightarrow \infty} c(x) = \infty$      $\lim_{x \rightarrow -\infty} c(x) = 0$

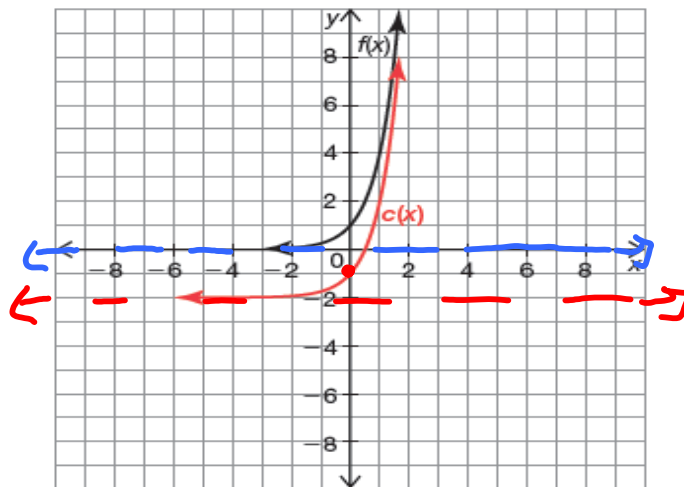
Intercepts:  $(0, 1)$

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

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

$(x, y-2)$

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$(-1, \frac{1}{4})$	$(-1, -\frac{7}{4})$
$(0, 1)$	$(0, -1)$
$(1, 4)$	$(1, 2)$



Domain: All real numbers;  $(-\infty, \infty)$

Range:  $y > -2$      $(-2, \infty)$

Horizontal asymptote:  $y = -2$

Transformed function:  $c(x) = 4^x - 2$

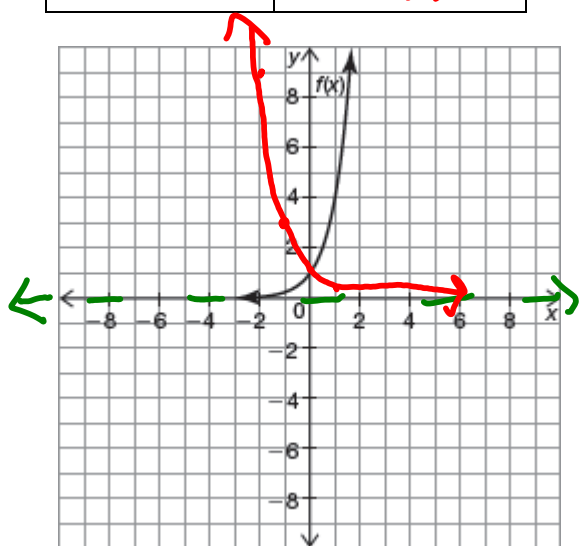
End Behavior:  $\lim_{x \rightarrow \infty} c(x) = \infty$      $\lim_{x \rightarrow -\infty} c(x) = -2$

Intercepts:  $(0, -1)$      $(\frac{1}{2}, 0)$

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  $c(x)$ , write the function for the transformed  $c(x)$  and state the end behavior using limit notation.

3.  $f(x) = 3^x$  and  $c(x) = f(-x)$

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$(-1, \frac{1}{3})$	$(-1, 3)$
$(0, 1)$	$(0, 1)$
$(1, 3)$	$(1, \frac{1}{3})$



Domain:  $(-\infty, \infty)$

Range:  $(0, \infty)$

Horizontal asymptote:  $y = 0$

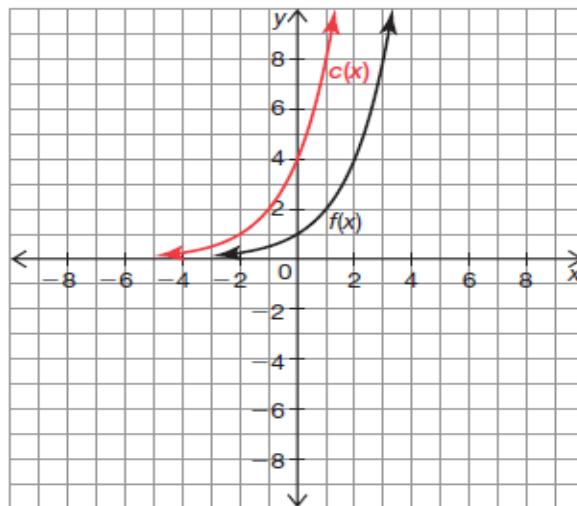
Transformed function: [REDACTED]

End Behavior:  $\lim_{x \rightarrow \infty} c(x) = 0$      $\lim_{x \rightarrow -\infty} c(x) = \infty$

Intercepts:  $(0, 1)$

4.  $f(x) = 2^x$   
 $c(x) = 4f(x)$

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$(-1, \frac{1}{2})$	$(-1, 2)$
$(0, 1)$	$(0, 4)$
$(1, 2)$	$(1, 8)$



Domain: All real numbers ;  $(-\infty, \infty)$

Range:  $y > 0$  ;  $(0, \infty)$

Horizontal asymptote:  $y = 0$

Transformed function:  $c(x) = 4 \cdot 2^x$

End Behavior:  $\lim_{x \rightarrow \infty} c(x) = \infty$      $\lim_{x \rightarrow -\infty} c(x) = 0$

Intercepts:  $(0, 4)$

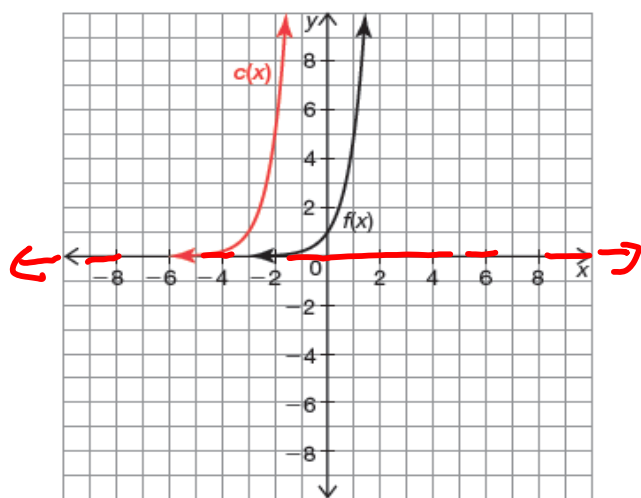
Complete the table to determine the corresponding points on  $c(x)$ , given reference points on  $f(x)$ . Then, graph  $c(x)$  on the same coordinate plane as  $f(x)$  and state the domain, range, and asymptotes of  $c(x)$ , write the function for the transformed  $c(x)$  and state the end behavior using limit notation.

5.  $f(x) = 5^x$

$c(x) = f(x+3)$

$(x-3, y)$

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$(-1, \frac{1}{5})$	$(-4, \frac{1}{5})$
$(0, 1)$	$(-3, 1)$
$(1, 5)$	$(-2, 5)$



Domain: All real numbers or  $(-\infty, \infty)$

Range:  $y > 0$   $(0, \infty)$

Horizontal asymptote:  $y = 0$

Transformed function:  $c(x) = 5^{x+3}$

End Behavior:  $\lim_{x \rightarrow \infty} c(x) = \infty$   $\lim_{x \rightarrow -\infty} c(x) = 0$

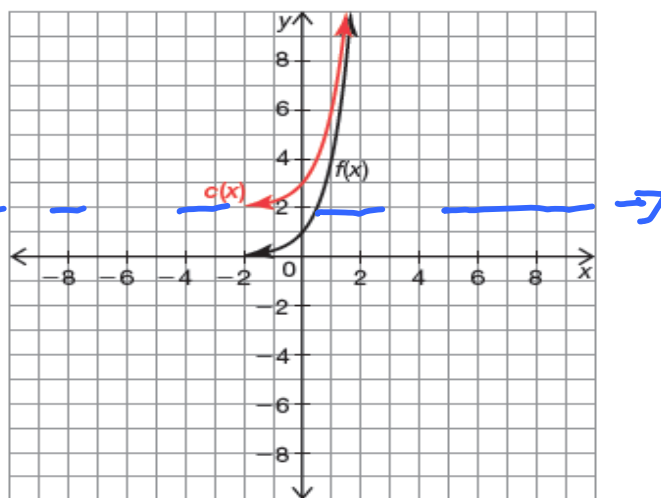
Intercepts: none

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

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

$(x, y+2)$

Reference Points on $f(x)$	Corresponding Points on $c(x)$
$(-1, \frac{1}{4})$	$(-1, 2\frac{1}{4})$
$(0, 1)$	$(0, 3)$
$(1, 4)$	$(1, 6)$



Domain: All real numbers  $(-\infty, \infty)$

Range:  $y > 2$   $(2, \infty)$

Horizontal asymptote:  $y = 2$

Transformed function:  $c(x) = 4^x + 2$

End Behavior:  $\lim_{x \rightarrow \infty} c(x) = \infty$   $\lim_{x \rightarrow -\infty} c(x) = 2$

Intercepts:  $(0, 3)$