

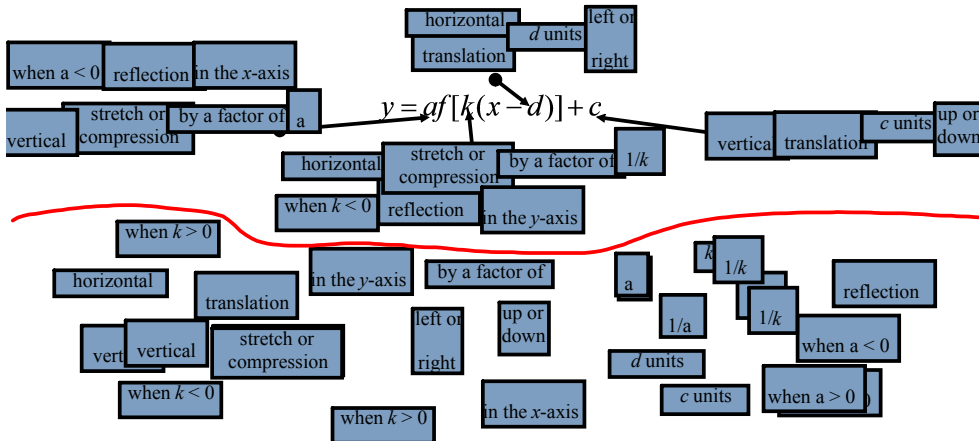
Graphing Functions (1.4)

Math Learning Target:



"When I am given the equation of a transformed parent function, I can describe all transformations in order, determine a mapping formula, and graph the function. When transformations are described, I can find its equation and graph. I can state all properties about a transformed parent function."

The function $y = f(x)$ can be transformed into $y = af[k(x-d)] + c$
 Use as many terms and values below to describe all of the possible transformations.
 Some may not be used.



Ex. 1 State the function that would result from horizontally compressing $y = f(x)$ by a factor of $1/4$, and then translating it 3 units left.

$$y = f[4(x+3)]$$

Ex. 2 For the function $y = 2 \cdot 3^x + 1$, state the:

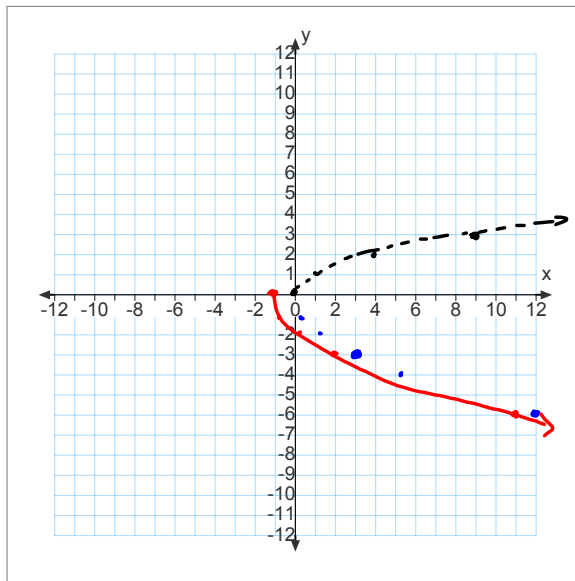
- a) parent function $y = 3^x$
- b) domain and range
- c) intervals of increase/decrease
- d) end behaviours

b) $D: \{x \in \mathbb{R}\}$
 $R: \{y \in \mathbb{R} \mid y > 1\}$

c) interval of increase $(-\infty, \infty)$
 decrease: none

d) end behaviours
 $x \rightarrow \infty, y \rightarrow \infty$
 $x \rightarrow -\infty, y \rightarrow 1$

Ex. 3 Describe, in order of application, the transformations of $f(x) = \sqrt{x}$ defined by $y = -f[3(x+1)]$. Graph the transformed function, and state the equation.



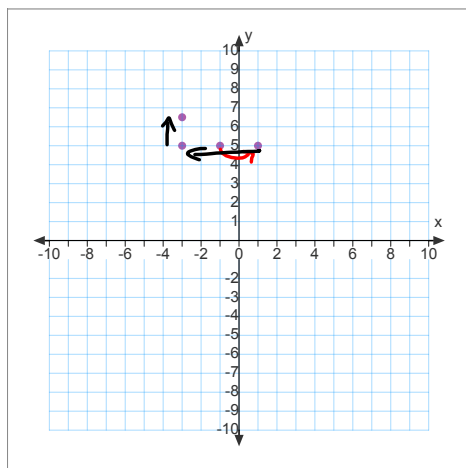
First:
 $y = -f[3(x+1)]$
 ↳ reflection in the x-axis
 ↳ hor. comp. by a factor of $\frac{1}{3}$
 ↳ hor. trans. 1 unit left

Ex. 4 The point $(-1, 5)$ belongs to the function $y = f(x)$. Determine its corresponding coordinates for the function $y = f(-x-4) + \frac{3}{2}$.

$$= f(-(x+4)) + \frac{3}{2}$$

Graphically

Numerically



Algebraically
 (mapping formula)

$$(x, y) \rightarrow (-x-4, y + \frac{3}{2})$$

$$(-1, 5) \rightarrow (-(-1)-4, (5) + \frac{3}{2})$$

$$\rightarrow (-1-4, 5 + \frac{3}{2})$$

$$\rightarrow (-3, 6\frac{1}{2})$$