

### 1.3 Combining Transformations:

Multiple transformations can be applied to the function  $y = f(x)$  that results in the general transformation model of  $y = af(b(x - h)) + k$  or  $y - k = af(b(x - h))$

Compressions/expansions and reflections ( $a/b$ ) occur before translations ( $h/k$ )

Use a mapping process to describe the change in the function.

#### Example 1:

Given that  $(3, 5)$  is a point on the function  $y = f(x)$

i.) State the mapping process after each transformation

ii.) Find the new point.

a.)  $y = 3f(x) - 2$

b.)  $y = f\left(-\frac{1}{3}(x + 2)\right)$

c.)  $y = -2f(3x) - 5$

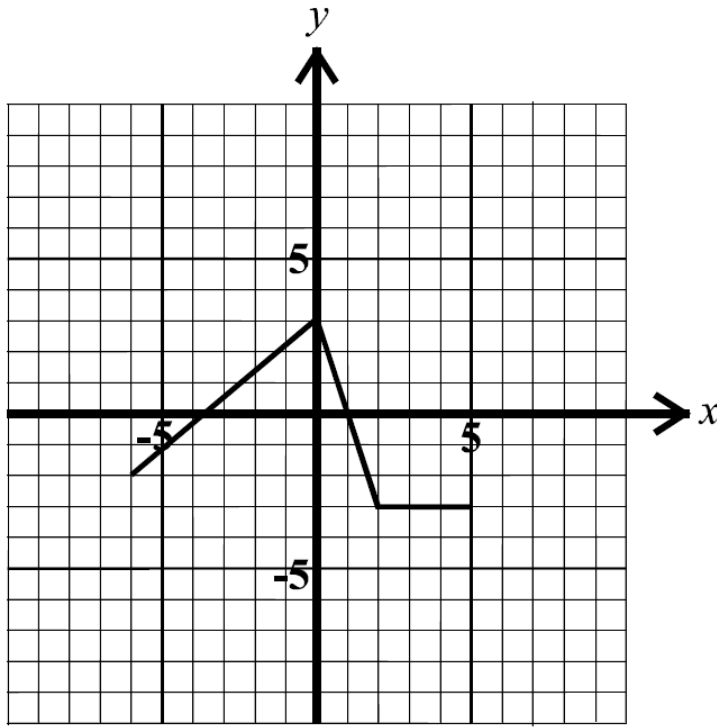
d.)  $y + 3 = -f(x - 6)$

e.)  $y = f(3x + 6) + 2$

f.)  $y = f\left(\frac{1}{2}x - 2\right)$

**Example 2:**

Given the following function  $y = f(x)$

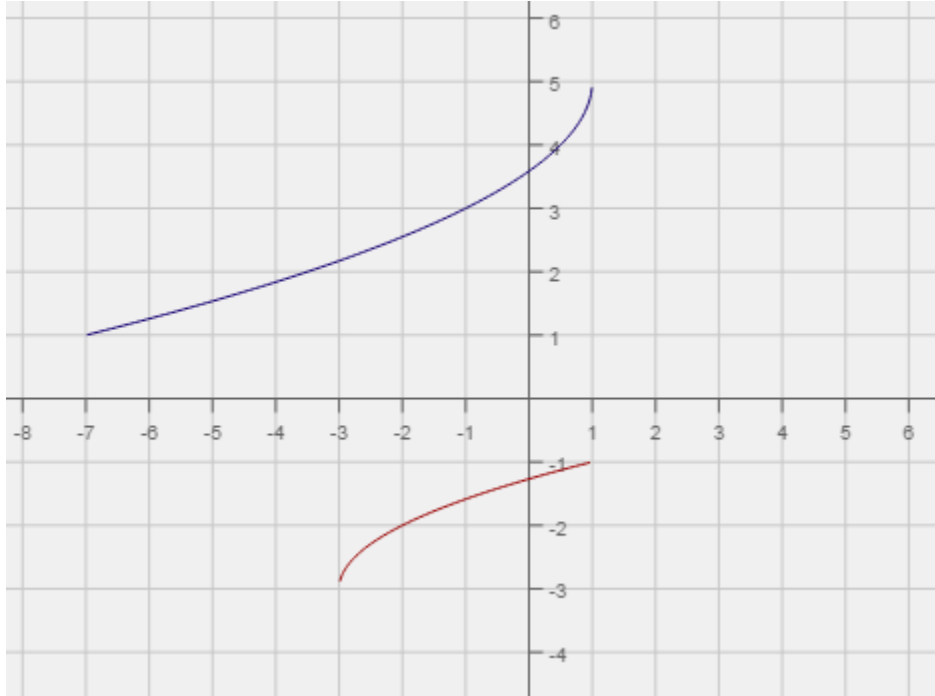


Sketch the graph

$$y = -3f\left(\frac{2}{3}(x - 1)\right) + 1$$

**Example 3:**

The graph of the function  $y = g(x)$  represents a transformation of the graph  $y = f(x)$ . Determine the equation of  $g(x)$  in the form  $y = af(b(x - h)) + k$

**Example 4:**

If  $y = f(x) = \sqrt{x} + 3$ , write the new equation for  $y = 0.5f(2(x - 5)) + 2$