

Example 3:

Given the graph of $y = f(x)$. Describe and sketch the graph of the transformations represented by $y + 4 = f\left(\frac{1}{2}(x + 1)\right)$.

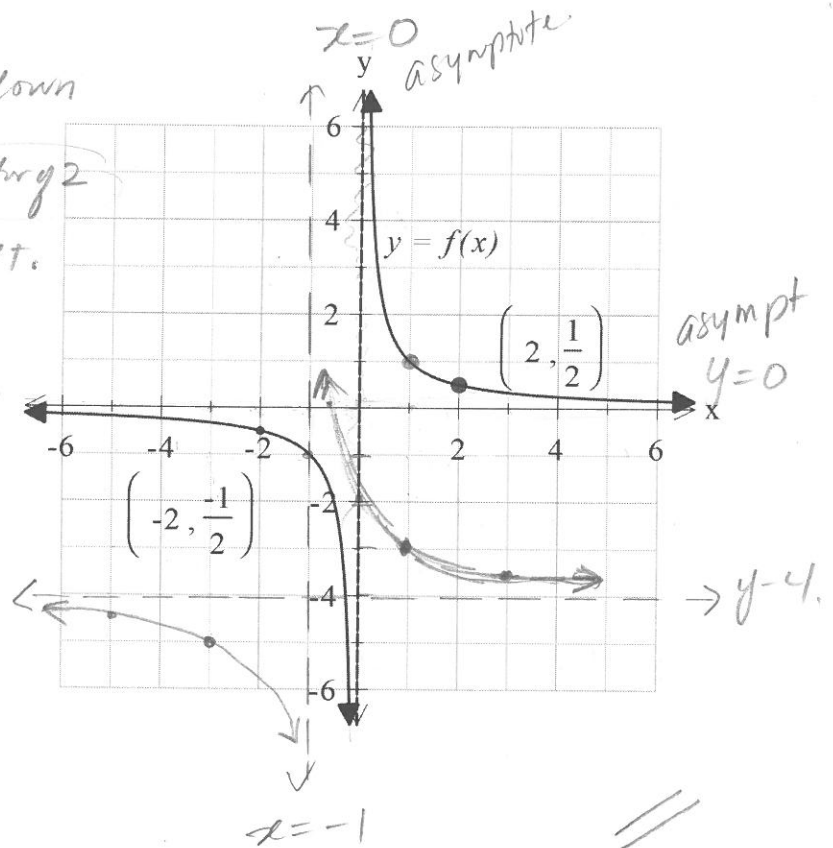
$$f(x) = \frac{1}{x}$$

Vertical translation 4 units down

horizontal stretch by a factor of 2

Horizontal translation 1 left.

(x, y)	$(2x-1, y-4)$
$(1, 1)$	$(1, -3)$
$(2, \frac{1}{2})$	$(3, -3.5)$
$(-1, -1)$	$(-3, -5)$
$(-2, -\frac{1}{2})$	$(-5, -4.5)$



Example 4:

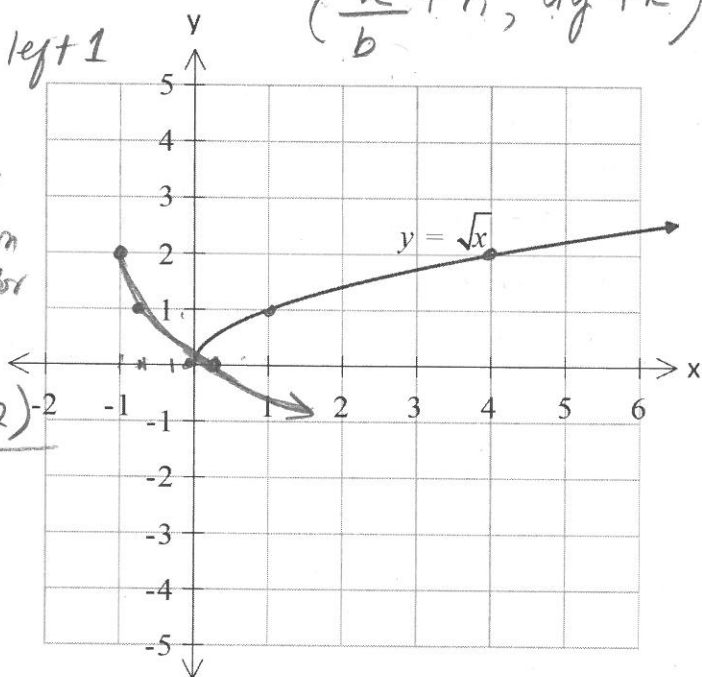
Given the graph of $y = \sqrt{x}$. Describe and sketch the graph of the transformations represented by $y - 2 = -\sqrt{3x + 3}$.

$$y - 2 = -\sqrt{3(x + 1)}$$

up 2 vertical reflection over x Horizontal Compression by a factor of $\frac{1}{3}$

$$\left(\frac{x}{b} + h, ay + k\right)$$

(x, y)	$\left(\frac{x}{3} - 1, -y + 2\right)$
$(0, 0)$	$(-1, 2)$
$(1, 1)$	$(-2/3, 1)$
$(4, 2)$	$(1/3, 0)$



$$\left(\frac{1x}{b} + h, ay + k \right)$$

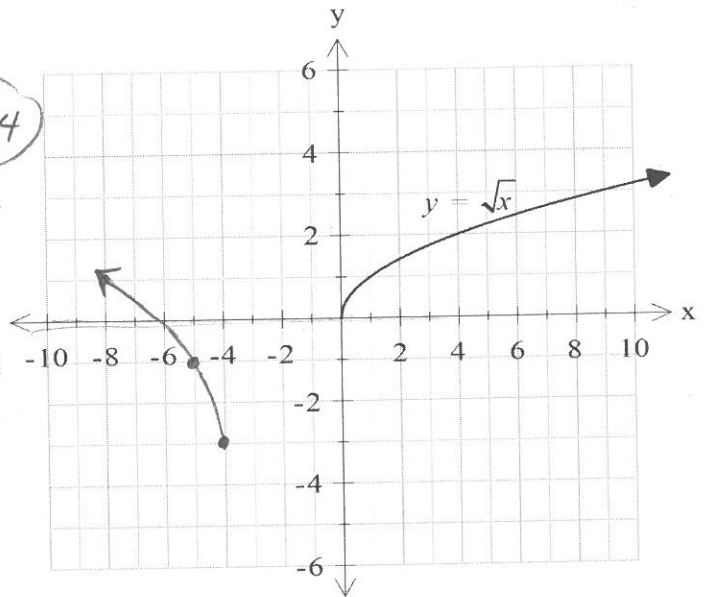
Example 5:

Given the graph of $y = \sqrt{x}$. Describe and sketch the graph of $y + 3 = 2\sqrt{-x - 4}$.

$y + 3 = 2\sqrt{-x - 4}$
 $y - (-3) = 2\sqrt{-1(x + 4)}$

down 3 $k = -3$
 vertical stretch by a factor of 2 $a = 2$
 horizontal reflection $b = -1$
 left 4 $h = -4$

(x, y)	$\left(\frac{x}{-1} - 4, 2y - 3 \right)$
$(0, 0)$	$(-4, -3)$
$(1, 1)$	$(-5, -1)$
$(4, 2)$	$(-8, 1)$



Example 6:

The graph of a function $y = f(x)$ is transformed as described below. Write the equation of the image graph in terms of the function f .

- a) A horizontal compression by a factor of $\frac{1}{5}$, a reflection in the x -axis, and a translation of 4 units left.

Hor. comp factor $\frac{1}{5}$ $b = 5$
 w/ Ver. reflection $a = -1$
 translation 4 left $h = -4$

$$y = -1 f(5(x + 4))$$

- b) A vertical stretch by a factor of 6, a reflection in the y -axis, and a translation of 8 units down.

$a = 6$
 horizontal reflection $-1 = b$
 $k = -8$

$$y + 8 = 6 f(-x)$$

- c) A horizontal stretch by a factor of 3, a vertical compression by a factor of $\frac{1}{3}$, and a translation of 0.5 units right and 4.5 units up.

Horizontal stretch factor 3 $b = \frac{1}{3}$
 Vertical compression factor $\frac{1}{3}$ $a = \frac{1}{3}$
 $h = 0.5$ $k = 4.5$

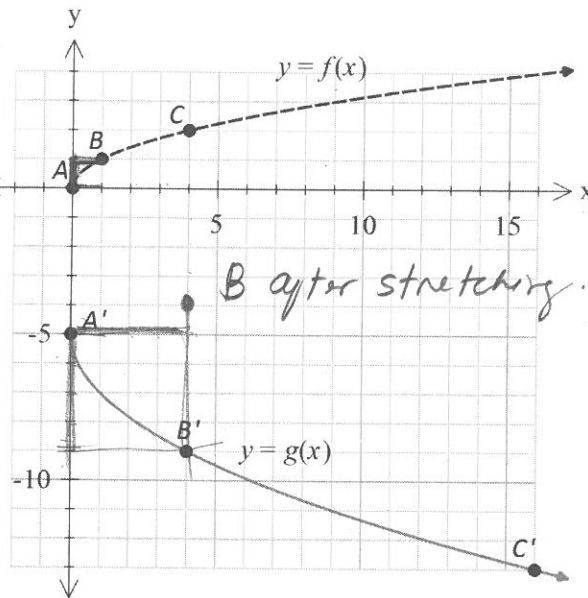
$$y - 4.5 = \frac{1}{3} f\left(\frac{1}{3}(x - 0.5)\right)$$

Example 7:

a) Determine an equation for $g(x)$ of the form $y - k = af(b(x - h))$ given the graphs of $y = f(x)$ and of the transformed function $y = g(x)$.

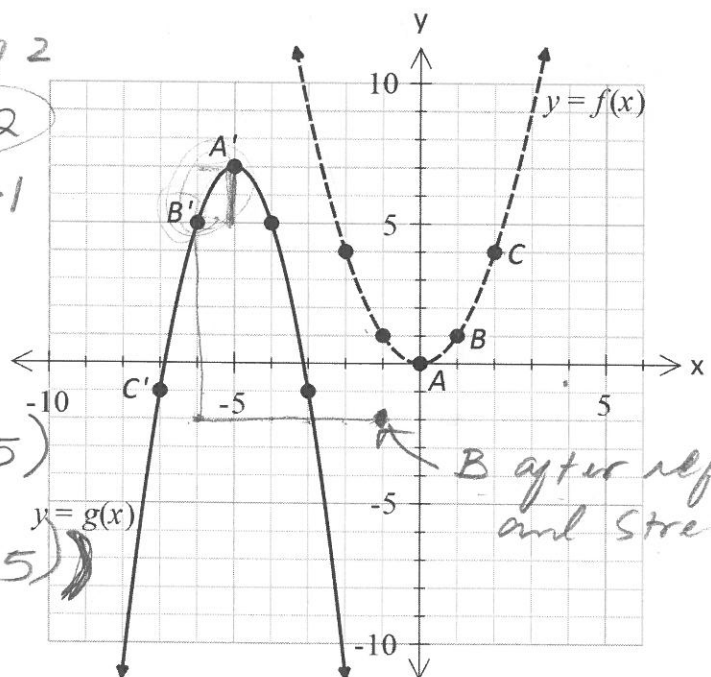
$$y - -5 = -4f\left(\frac{1}{4}x - 0\right)$$

$$y + 5 = -4f\left(\frac{1}{4}x\right)$$



b) Determine an equation for $g(x)$ of the form $y - k = af(b(x - h))$ given the graphs of $y = f(x)$ and the transformed function $y = g(x)$.

Vertical stretch by factor of 2
 Vertical reflection $a = -2$
 Horizontal reflection $b = -1$
 $B(1, 1) \Rightarrow$
 left 5 up 7



$$y - +7 = -2f(-1(x - -5))$$

$$y - 7 = -2f(-1(x + 5))$$

Assignment Time! Work on p.226- 3 - 10 (not 10c), 12, MC 1&2