

1.8 Transformations of Functions

Feb 17

$$y = af[\underbrace{k(x-b)}_{\text{horizontal stretch/compression and reflection}}] + c$$

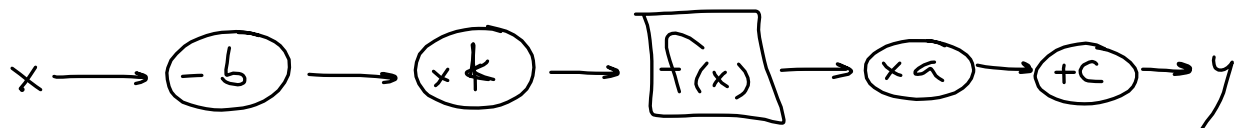
a - VERTICAL STRETCH, $a < 0 \rightarrow$ REFLECTION IN X-AXIS

k - HORIZONTAL STRETCH BY A FACTOR OF $\frac{1}{k}$
 $k < 0 \rightarrow$ REFLECTION IN Y-AXIS

b - HORIZONTAL TRANSLATION BY $(-b)$

c - VERTICAL TRANSLATION BY (c)

Input/Output $y = af[k(x-b)] + c$



Mapping rule $y = af[k(x-b)] + c$

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

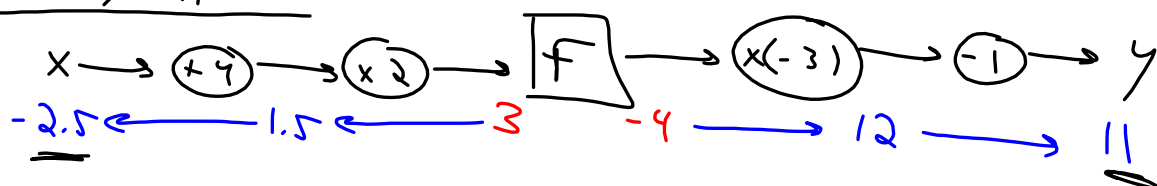
ex Determine the image of the point $(3, -4)$ under the following transformation

$$y = -3f(2(x+4)) - 1$$

MAPPING $(x, y) \rightarrow \left(\frac{1}{2}x - 4, -3y - 1\right)$

$$(3, -4) \rightarrow \left(\frac{1}{2}(3) - 4, -3(-4) - 1\right) = (-2.5, 11)$$

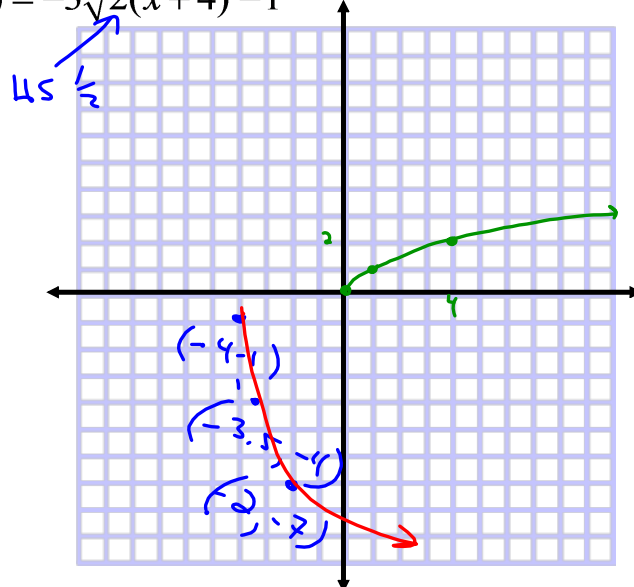
INPUT/OUTPUT



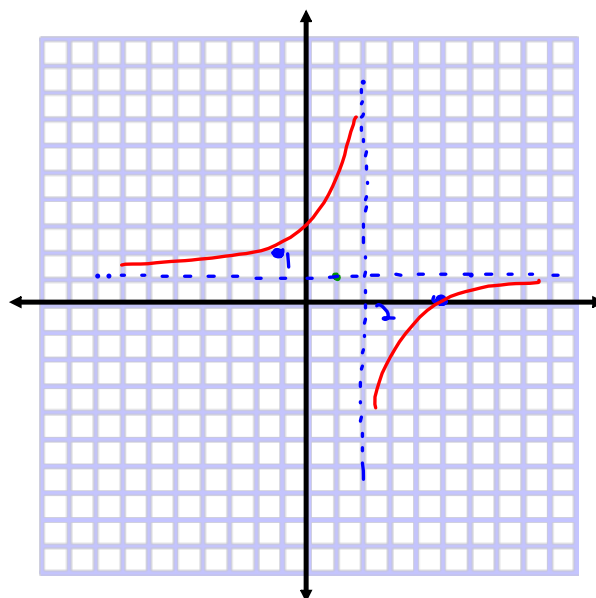
ex Sketch

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

$$-3\sqrt{2x+8} - 1$$



ex. Given $f(x) = 1/x$, sketch the graph of $y = -f\left(\frac{x-2}{3}\right) + 1$



Homework p. 70#1,5-10,18,22