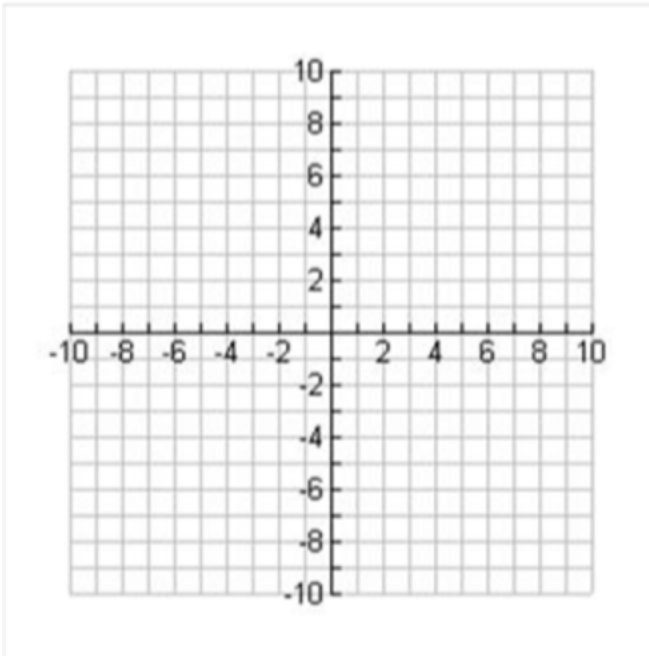


1.2 Reflections and Stretches

Reflections:

Consider and graph the following three functions:

$$y = \sqrt{x}, y = -\sqrt{x} \text{ and } y = \sqrt{-x}$$

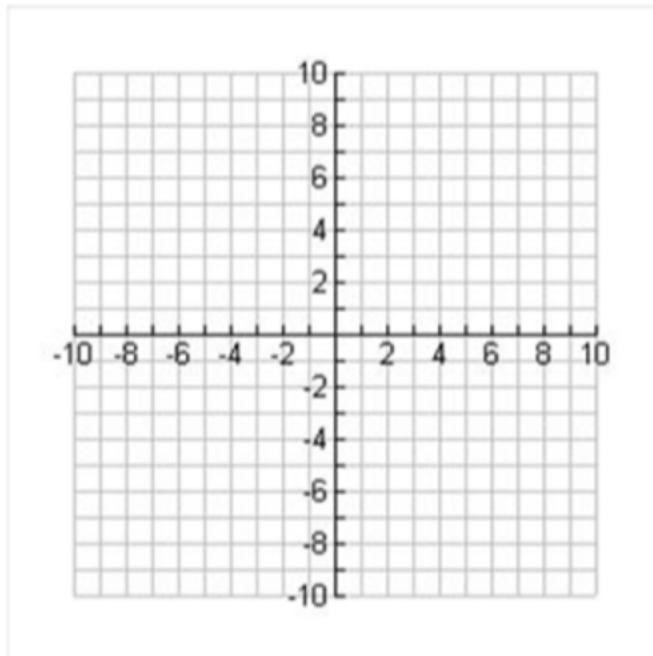


Describe the transformations in each situation. Consider which variable is affected in each situation.

Stretches/Compressions:

Consider and graph the following three functions:

$$y = \sqrt{x}, y = 2\sqrt{x} \text{ and } y = \sqrt{2x}$$



Describe the transformations in each situation. Consider which variable is affected in each situation.

What do you think will happen in the following transformations with respect to $y = f(x)$?

a.) $y = \frac{1}{3}f(x)$

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

Summary:

Vertical (affecting the y-values): $y = af(x)$

$a < 0$ (reflection across x-axis)

$|a| > 1$ is a vertical expansion

$|a| < 1$ is a vertical compression

Horizontal (affecting the x-values): $y = f(bx)$

$b < 0$ (reflection across y-axis)

$|b| > 1$ is a horizontal compression

$|b| < 1$ is a horizontal expansion

Example 1:

Given point (3, 6) is in $y = f(x)$.

i.) What is the new point after the following:

ii.) Indicate the mapping that has occurred:

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

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

c.) $y = f\left(\frac{3}{4}x\right)$

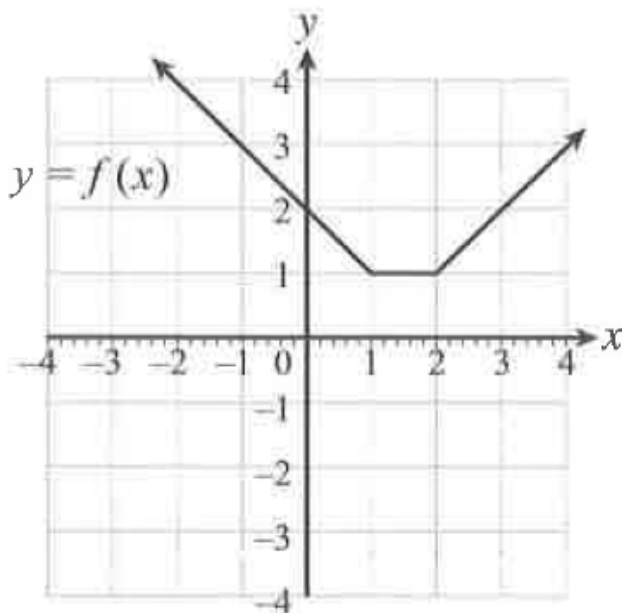
d.) $y = f(-2x)$

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

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

Example 2:

Given the following graph $y = f(x)$.



Describe the transformation of the graph $g(x) = 2f(x)$. Sketch the graph of $g(x)$ and state the domain and range.