

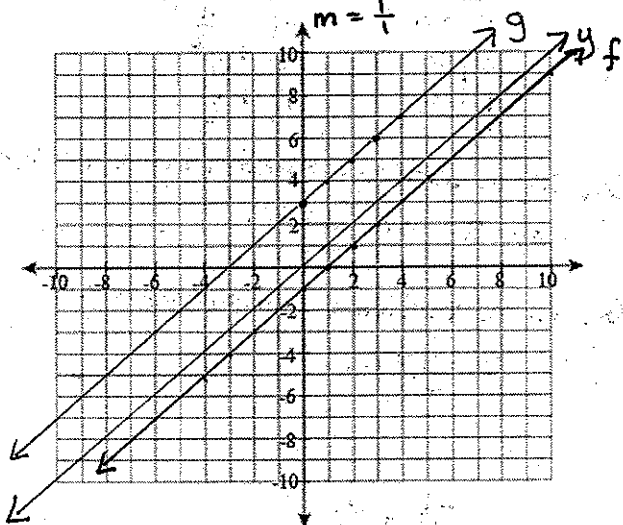
Changing
3.6 Introduction to Transforming Linear Functions

Family Parent function
 $y = x$

Exploring Transformation:

Graph the following functions on the same coordinate plane:

$y = x$ $(0, -1)$ $f(x) = x - 1$ $g(x) = x + 3$ $(0, 3)$
 $m = \frac{1}{1}$ $m = \frac{1}{1}$



x	y
-1	-1
0	0
1	1

x	f(x)
-1	-2
0	-1
1	0

x	g(x)
-1	2
0	3
1	4

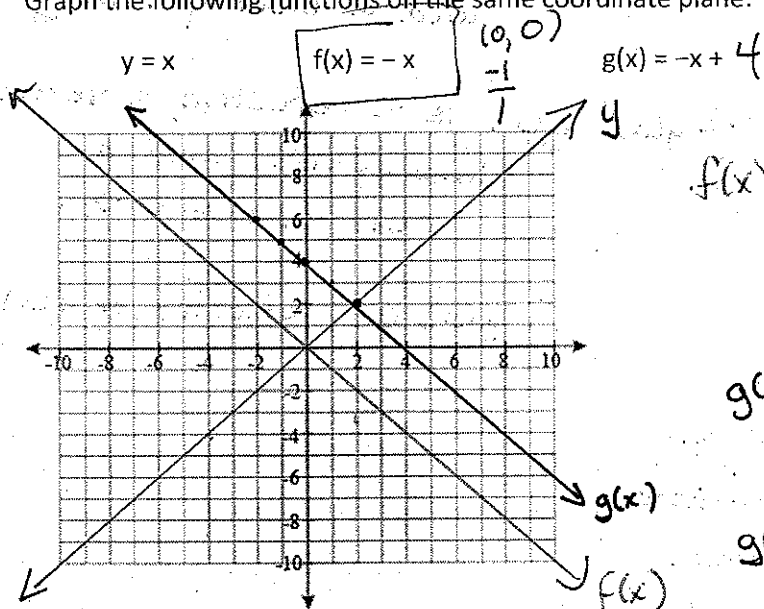
$f(x)$ is a vertical shift down 1 of $y = x$.

$g(x)$ is a shift up 3 of $y = x$.

Describe the transformations that occurred:

g is moved up 3
 f is shifted down 1

Graph the following functions on the same coordinate plane:



$(0, 4)$
 $m = \frac{-1}{1} = \frac{1}{-1}$

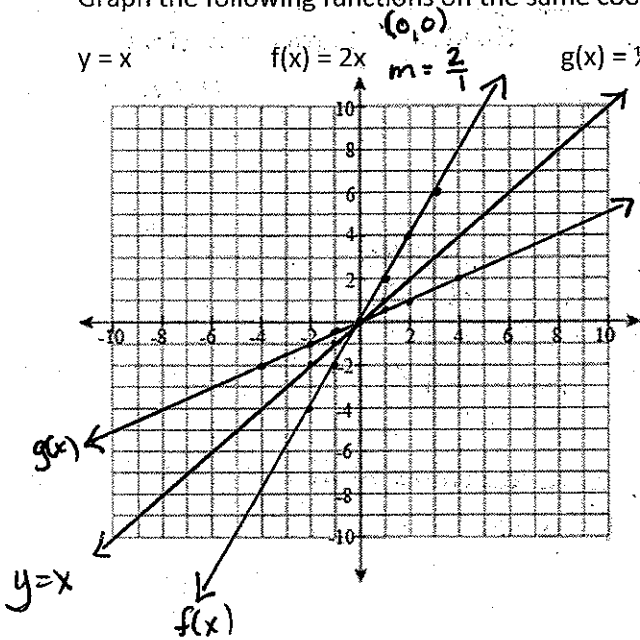
$f(x)$ is a reflection of $y = x$.

$g(x)$ is a reflection and a shift up 4 of $y = x$.

$g(x)$ is a shift up of $f(x)$.

Graph the following functions on the same coordinate plane:

$y = x$ $f(x) = 2x$ $g(x) = \frac{1}{2}x$ $m = \frac{1}{2}$
 Describe the transformation that occurred:



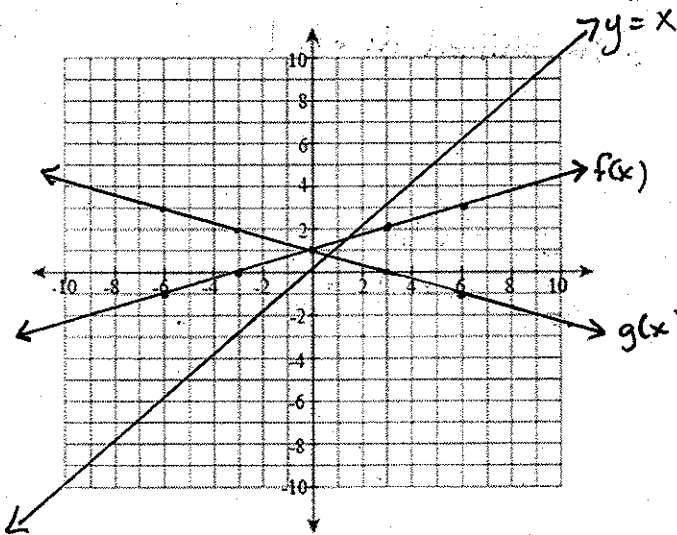
x	y	x	f(x)	x	g(x)
-1	-1	-1	-2	-1	$-\frac{1}{2}$
0	0	0	0	0	0
1	1	1	2	1	$\frac{1}{2}$

$f(x)$ is a vertical stretch by a factor of 2 of $y=x$.

$g(x)$ is a vertical compression of $y=x$.

Graph the following functions on the same coordinate plane:

$y = x$ $f(x) = \frac{1}{3}x + 1$ $g(x) = -\frac{1}{3}x + 1$ $m = -\frac{1}{3} = \frac{1}{-3}$
 Describe the transformation that occurred:



$f(x)$ is a vertical compression and a shift up 1 of $y=x$.

$g(x)$ is a reflection, a vertical compression and a shift up 1 of $y=x$.

$g(x)$ is a reflection of $f(x)$.

$$y = mx + b$$

When b increases, the graph is shifted up.

When b decreases, the graph is shifted down.

When m is negative, the graph is reflected.

When $|m| > 1$, the graph is vertically stretched.

When $0 < |m| < 1$, the graph is vertically compressed.