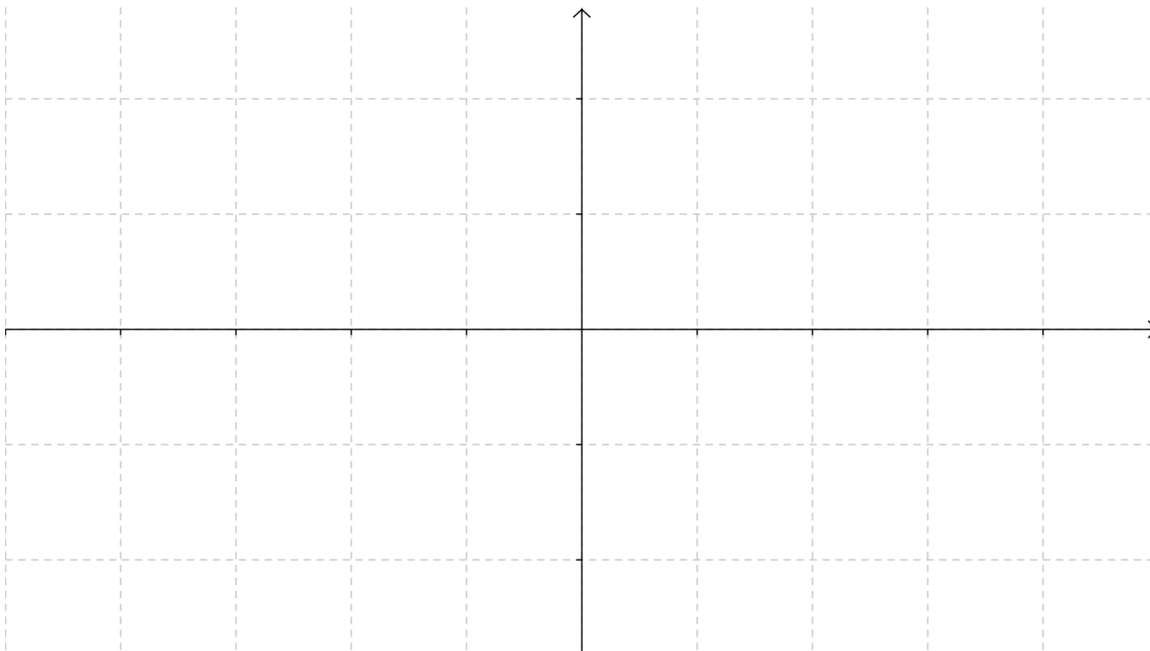


1. Graph  $y = \sin x$ .
2. Graph  $y = -\sin x$ . Describe what happens.
3. Graph  $y = 2\sin x$  and  $y = .5\sin x$ . Describe what happens.
4. Without deleting the equations, un-highlight them so we can test this theory with another parent function.
5. Enter another function into your calculator ( $y = x^2$ ,  $y = |x|$ ,  $y = x^3$ , whichever you prefer). Also enter  $-f(x)$  and  $2f(x)$ . Sketch the parent function and what happened with each transformation.



Summary of  $a \bullet f(x)$ :

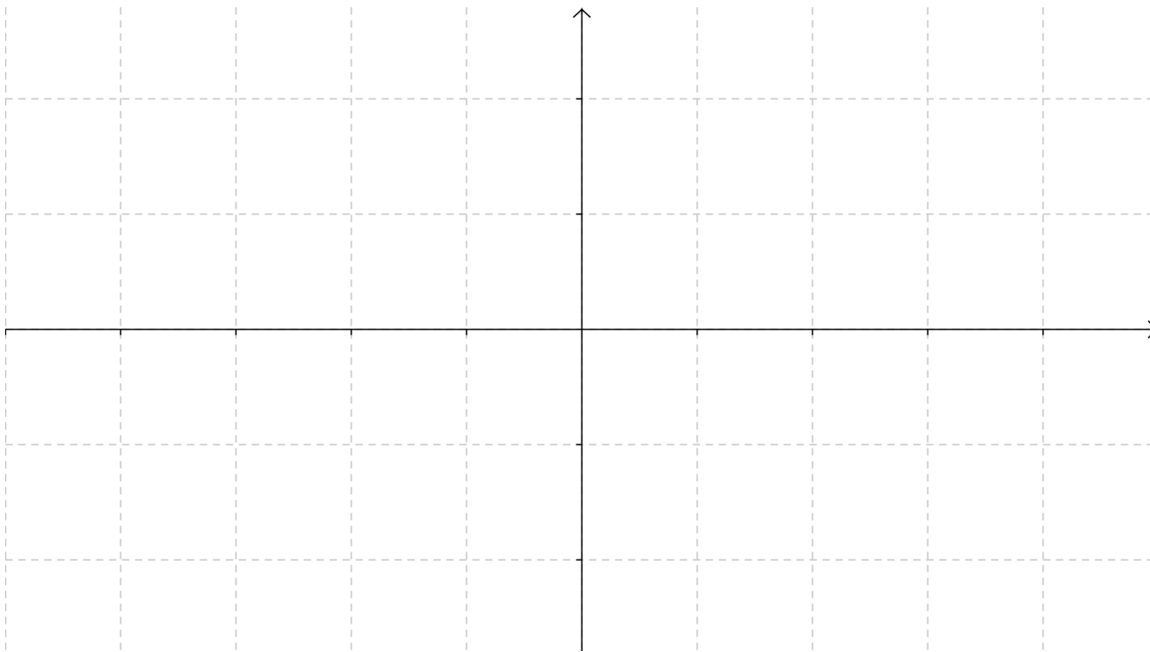
If  $a > 1$ ,

If  $0 < a < 1$ ,

If  $a < 0$

6. Turn off your parent functions graphs (without deleting them) and go back to your  $y = \sin x$  equations. Reset  $a = 1$  (by deleting it).

7. Try graphing  $y = \sin(2x)$  and  $y = \sin(.5x)$ .
8. Describe how “b” transforms the graph of  $y = \sin x$ .
9. Now try a b value that is negative.
10. Now turn off your sine graphs and try the same transformations on your favorite parent graph. Sketch your parent function with the changes you explored.



Summary of  $y = f(b \bullet x)$ :

If  $c > 1$ :

If  $0 < c < 1$ :

If  $c < 0$ :

11. Now graph  $y = \cos x$  and  $y = \cos(.5x)$ .
12. Hit trace on the  $y = \cos x$  graph and enter  $x = 1$ . Note the y value:
13. Now hit trace on the  $y = \cos(.5x)$  graph and note the y value:
14. How are these ordered pairs related?

$(1, \underline{\quad}) \rightarrow (\underline{\quad}, \underline{\quad})$

**\*\*By replacing x by x/a and y by y/b in a sentence, applies the scale change (x,y)→(ax, by).\*\***

$$\frac{y}{b} = \sin\left(\frac{x}{a}\right)$$

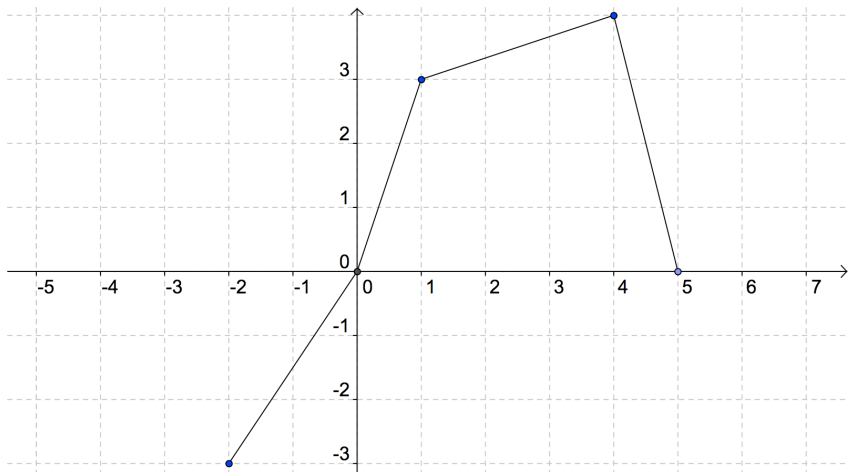
15. Describe the transformations that take place. Be sure to list the transformations in the correct sequence.  $f(x) = 3\sqrt{x+1} - 4$

(x,y)→(        ,        )

16. Describe the transformations that take place. Be sure to list the transformations in the correct sequence.  $f(x) = 3(\sqrt{x+1} - 4)$  This is not the same as #15.

(x,y)→(        ,        )

17. Use the graph of  $g$  to sketch the graphs below.



Key Points:

$(-2, -3)$

$(0, 0)$

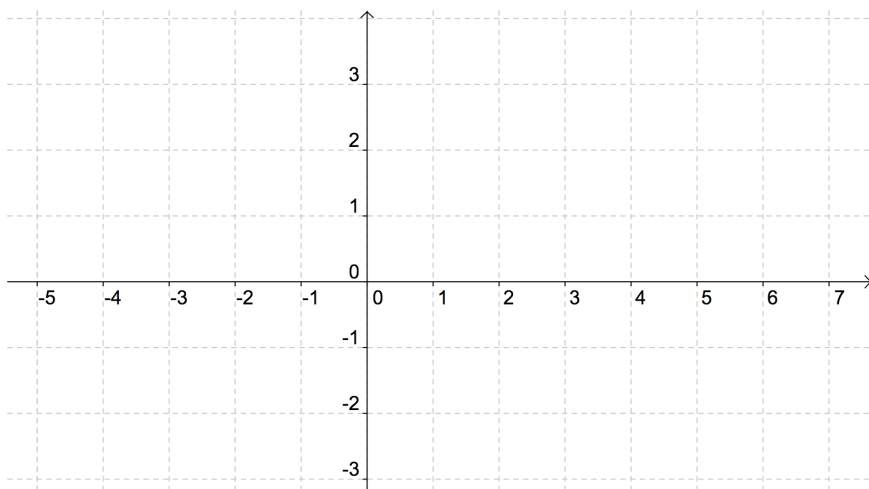
$(1, 3)$

$(4, 4)$

$(5, 0)$

a.  $f(x) = \frac{1}{2} g(x)$

This transformation maps each point  $(x, y)$  onto ( , )



New Coordinates of Key Points

$(-2, -3)$  →→→

$(0, 0)$  →→→

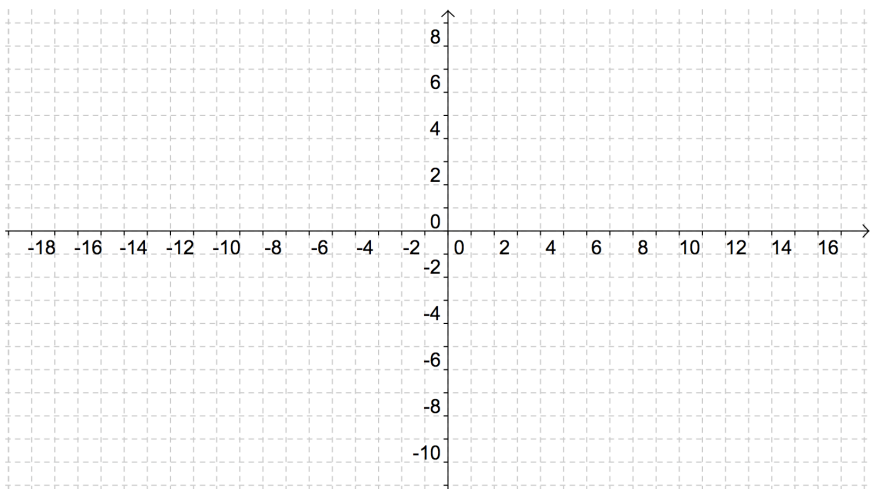
$(1, 3)$  →→→

$(4, 4)$  →→→

$(5, 0)$  →→→

b.  $f(x) = -2g(x-1)-3$

This transformation maps each point  $(x, y)$  onto ( , )



New Coordinates of Key Points

$(-2, -3)$  →→→

$(0, 0)$  →→→

$(1, 3)$  →→→

$(4, 4)$  →→→

$(5, 0)$  →→→