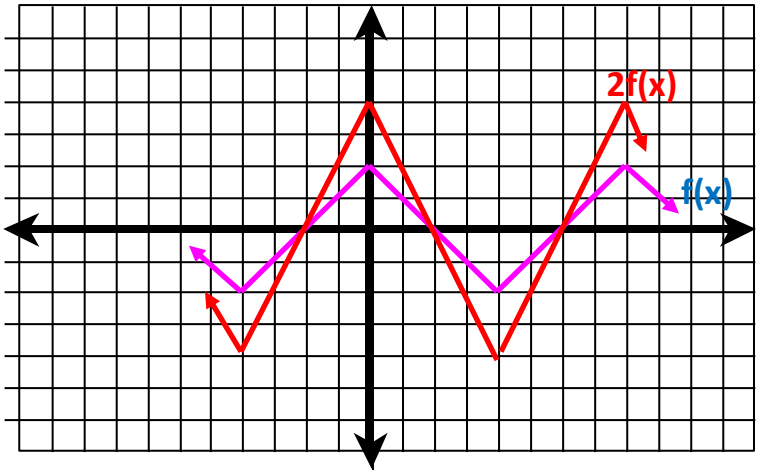
COLLEGE REVIEW MATH

SECTION 4D

TRANSFORMATIONS



New coordinates for 2f(x)

x	y
-4	-4
-3	-2
-2	0
-1	2
0	4
etc.	etc.

1 STRETCHING *OR* SHRINKING

Graph for 2f(x) is above in red.

f(-4) =	-2;	(-4,-2)
f(-3) =	-1;	(-3,-1)
f(-2) =	0	(-2, 0)
f(-1) =	1	(-1, 1)
f(0) =	2	(0, 2)
f(1) =	1	(1, 1)
f(2) =	0	(2, 0)
f(3) =	-1	(3, -1)
f(4) =	-2	(4, -2)
f(5) =	-1	(5, -1)
f(6) =	0	(6, 0)
f(7) =	1	(7, 1)
f(8) =	2	(8, 2)

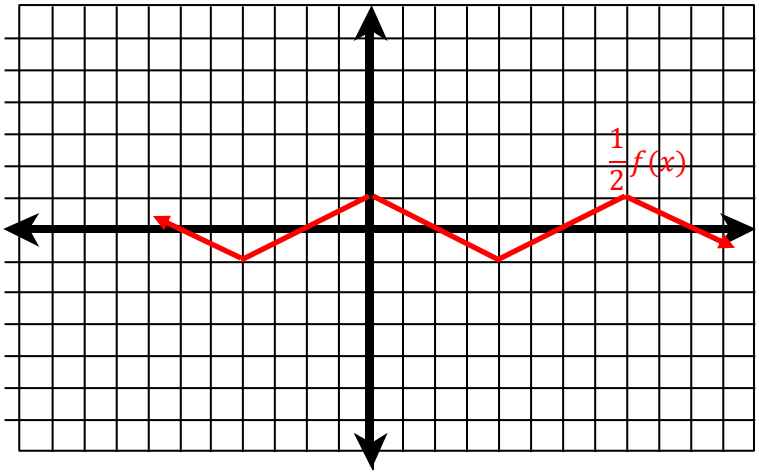
Use the coordinates you listed to come up with a new set of coordinates for **2f(x).** Then graph the new coordinates to see what happens to the graph.

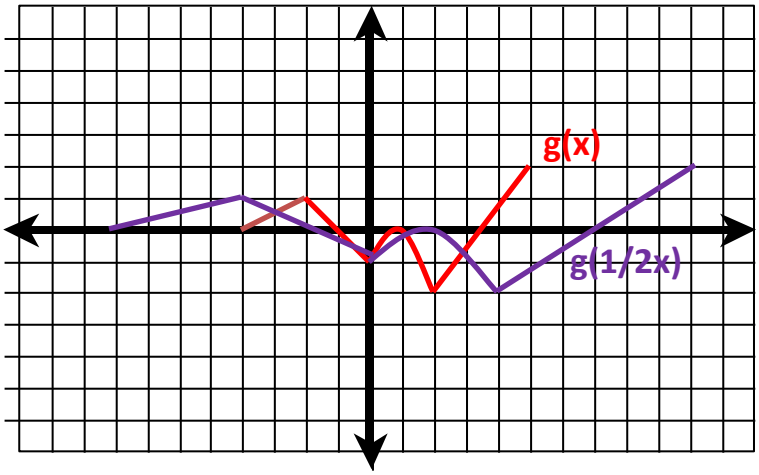
Conclusion: the graph was stretched vertically.

Use the grid below to graph $\frac{1}{2}$ **f(x)**

Attempt to do so without relisting the coordinates.

Conclusion: the graph was shrunk vertically.





x	y
-4	1
-2	0
0	-1
2	0
4	-2

2

Graph for g(1/2x) is above in purple.

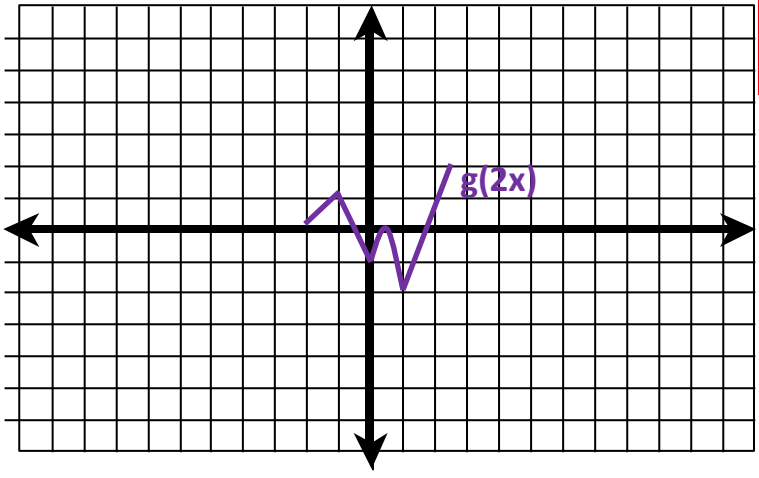
g(-4) = 0; (-4,0)
g(-2) = 1; (-2,1)
g(-1) = 0; (-1, 0)
g(0) = -1; (0, -1)
g(1) = 0; (1, 0)
g(2) = -2; (2, -2)
g(3) = impossible to tell
g(4) = 1; (4, 1)

Use the coordinates you listed to come up with a new set of coordinates for $\mathbf{g(\frac{1}{2}x)}$. Then graph the new coordinates to see what happens to the graph.

Conclusion: the graph was stretched horizontally.

Use the grid below to graph **g(2x).** Attempt to so without relisting the coordinates.

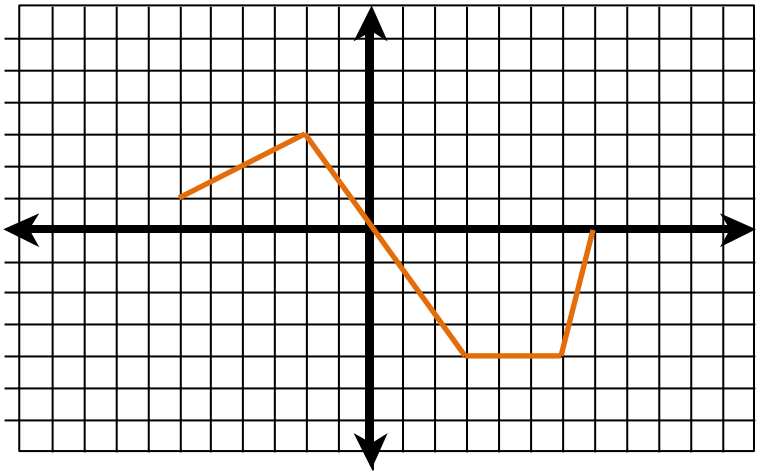
Conclusion: the graph was shrunk horizontally.

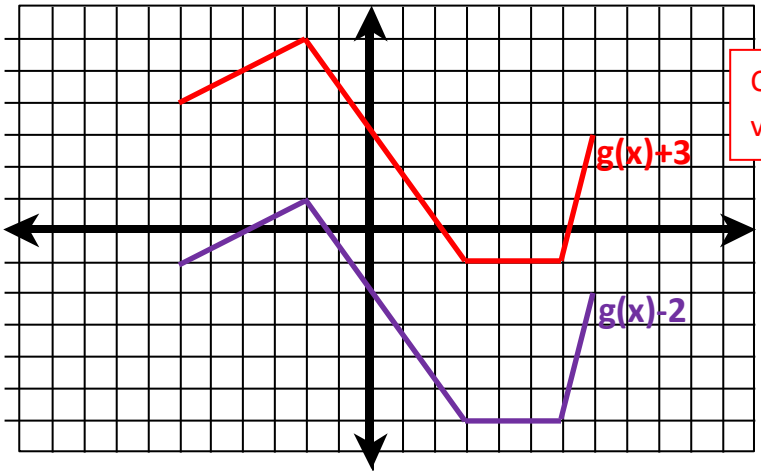


TRANSLATING GRAPHS (left, right, up or down)

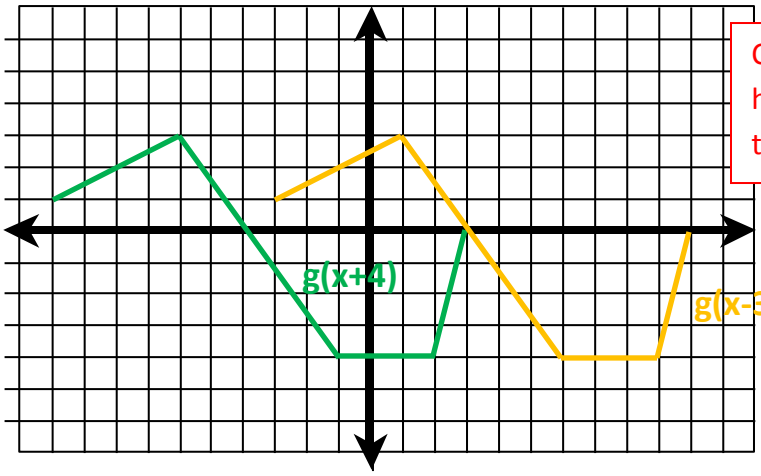
If g(x) is shown below, determine the graph for

a) g(x) + 3 b) g(x) – 2 c) g(x + 4) d) g(x – 3)





Conclusion: the graphs moved vertically that many units.

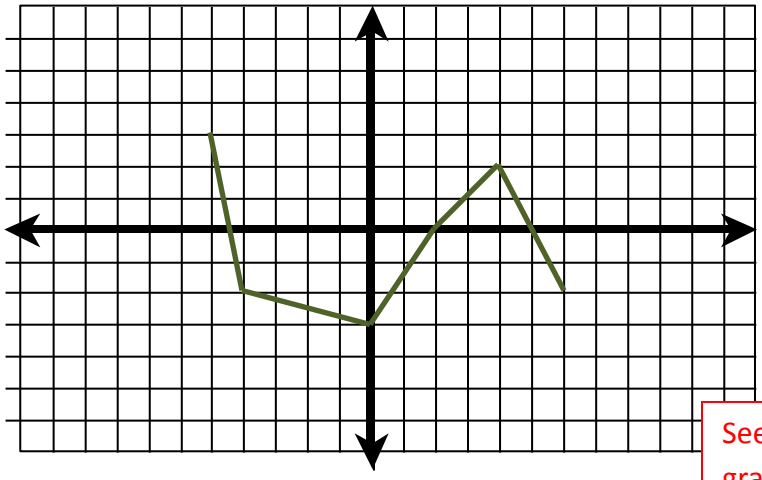


Conclusion: the graphs moved horizontally that many units (in the opposite direction).

SECTION 4-3 & 4-4

Reflections and Transformations and Translations to try:

If f(x) is shown below…



See Mr. Paull for the graphs to these.

1) Find $f\left(\frac{1}{2}x\right)$

2) Find $2f(x)$

3) Find $-f(x)$

4) Find $f(-x)$

5) Find $|f(x)|$

6) Find $f(x)-3$

7) Find $f(x+4)$

8) Find $f(-2x-1)$

COORDINATES

Use the x/y-chart to the right to rewrite the coordinates for all the scenarios to follow. Remember, outside affects the y and inside affects the x. y's do what you'd expect while x's do the opposite. Have fun!

f(x) =

x	y
3	-8
0	1
-2	-7
-5	12

1) -f(x)

x	y
3	8
0	-1
-2	7
-5	-12

2) f(-x)

x	y
-3	-8
0	1
2	-7
5	12

3) | f(x) |

x	y
3	8
0	1
-2	7
-5	12

4) y = x or f(y)

x	y
-8	3
1	0
-7	-2
12	-5

5) 3f(x)

x	y
3	-24
0	3
-2	-21
-5	36

6) $f(\frac{1}{2}x)$

x	y
6	-8
0	1
-4	-7
-10	12

7) f(x) + 6

x	y
3	-2
0	7
-2	-1
-5	18

8) f(x + 5)

x	y
-2	-8
-5	1
-7	-7
-10	12

9) -2f(x)

x	y
3	16
0	-2
-2	14
-5	-24

BONUS ROUND

10) f(-x) + 1

x	y
-3	-7
0	2
2	-6
5	13

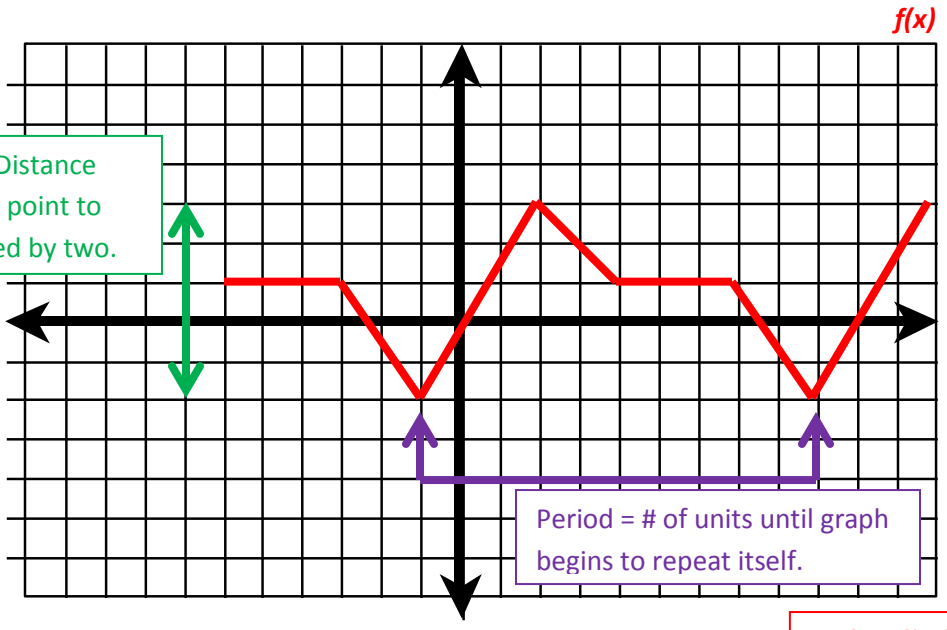
11) $\frac{1}{2}f(x+9)$

x	y
-6	-4
-9	0.5
-11	-3.5
-14	6

12) -2f(x) + 4

x	y
3	20
0	2
-2	18
-5	-20

PERIOD (periodic functions) AND AMPLITUDE



To find f(?): Divide ? by the period, then use the remainder to locate it on the graph.

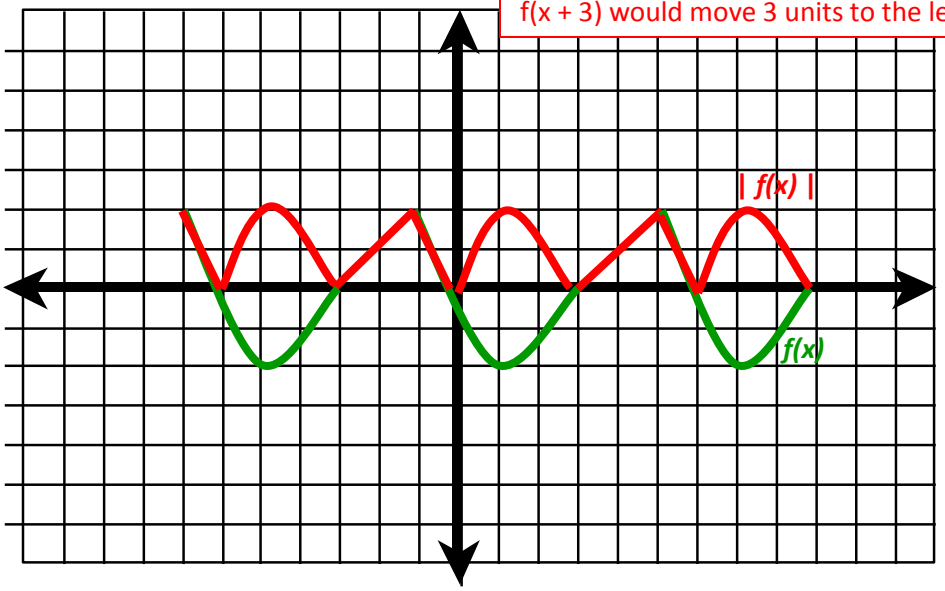
Period = 10 Amplitude = 2.5

Find f(25) = f(5) = 1 f(-25) = f(-5) = 1 f(102) = f(2) = 3

Draw 2f(x) Draw $f(\frac{1}{2}x)$ Draw f(x + 3)

25 ÷ 10 has a remainder of 5. Find f(5) on the graph.

f(1/2x) would "stretch" horizontally.
f(x + 3) would move 3 units to the left.



Period = 6 Amplitude = 2

Find f(1000) = f(4) = 1 f(-999) = f(-3) = 0 f(-331) = f(-1) = 2

Draw |f(x)| shown above in red Draw -f(x) reflects over x-axis Draw $\frac{1}{2}f(x)+4$ shrinks vert. moves up 4