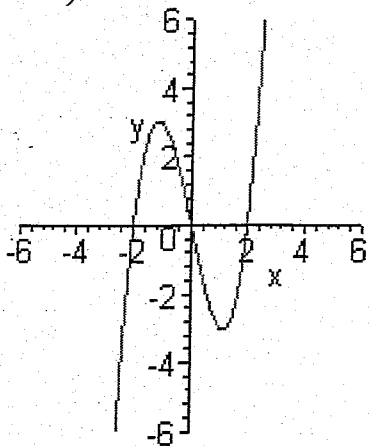
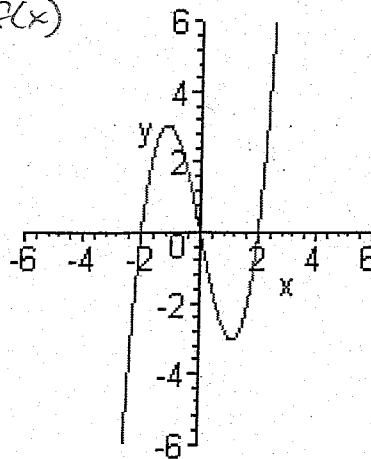


## Math 173 – Section 2.4: Vertical and Horizontal Scaling

$y = f(x)$

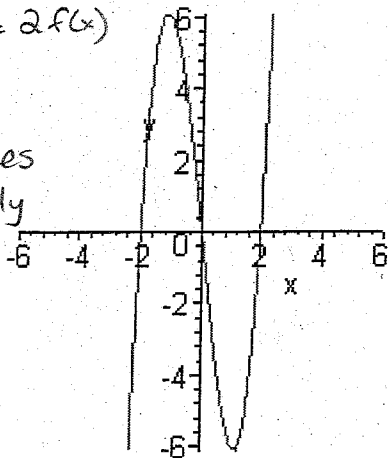


$y = f(x)$



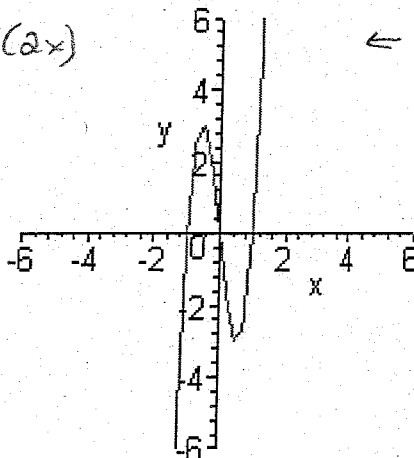
$y = 2f(x)$

↑  
stretches  
vertically  
by  
factor  
of  
2



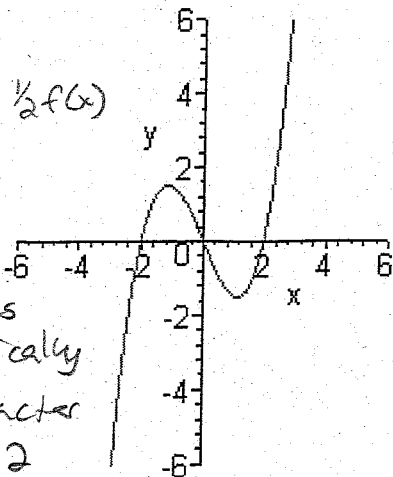
$y = f(2x)$

← shrinks  
horizontally  
(squishes!)  
by factor  
of 2



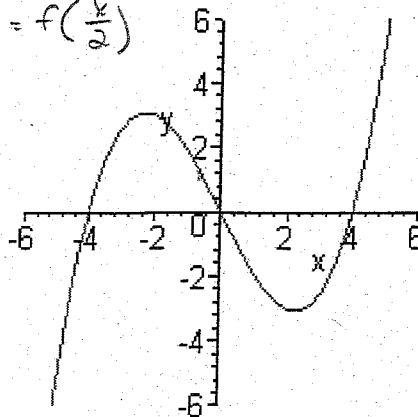
$y = \frac{1}{2}f(x)$

↑  
shrinks  
vertically  
by factor  
of 2



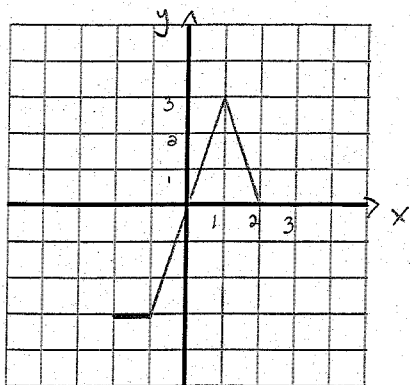
$y = f\left(\frac{x}{2}\right)$

← expands  
horizontally  
by factor  
of 2  
(or shrinks by  
 $\frac{1}{2}$  if you  
like)

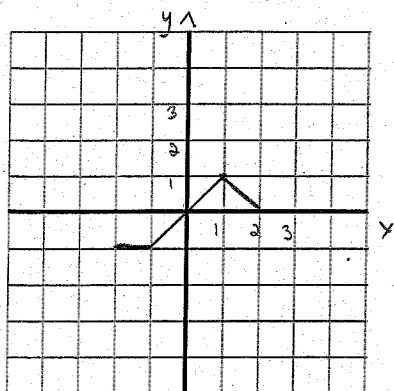


(or stretches by  $\frac{1}{2}$ ,  
if you like)

If  $y=f(x)$  looks like this:

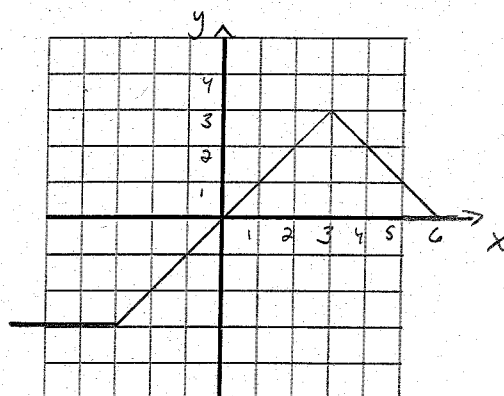


then sketch  $y = \frac{1}{3}f(x)$



and

$y = f(x/3)$



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

↓  
shrinks vertically  
by factor of 3

$$y = f(x/3)$$

↑  
expands horizontally  
by factor of 3