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① $y=(x+1)^2+4$

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

→

x	y
-3	8
-2	5
-1	4
0	5
1	8

$y=x^2$ → $y=(x+1)^2+4$

② $y=|x-2|-4$

★ Vertical and Horizontal Shrinking and Stretching

- Vertical: To Stretch away from the x-axis, multiply the equation by a where $a>1$.
- To Shrink away from the x-axis, multiply the equation by a, where $0<a<1$.

ex: $f(x)=|x|$ $g(x)=2|x|$ $h(x)=\frac{1}{2}|x|$

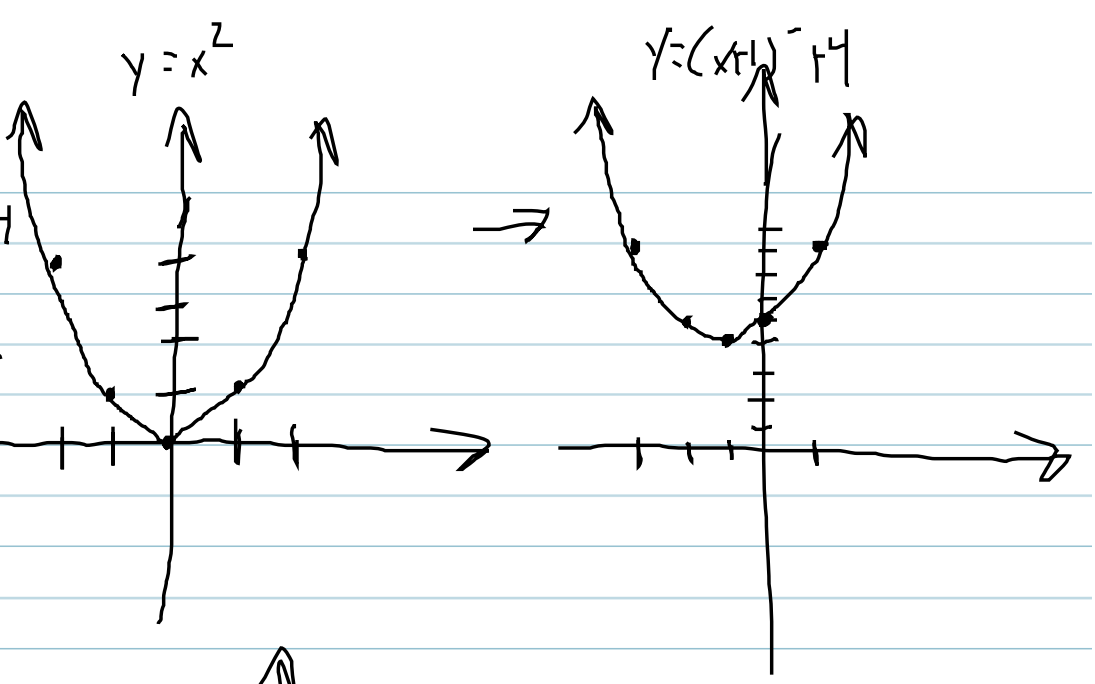
livescribe

(1) $y = (x+1)^2 + 4$

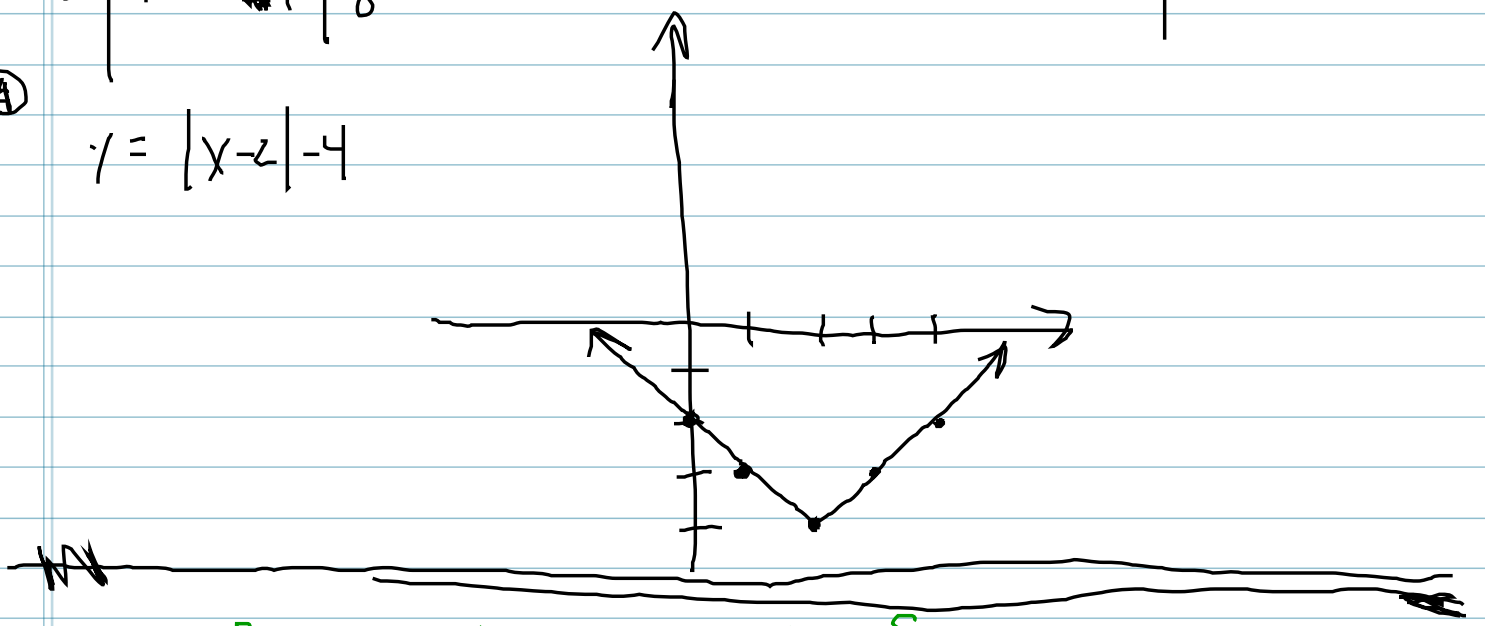
x	y
-2	4
-1	1
0	0
1	1
2	4

→

X	Y
-3	8
-2	5
-1	4
0	5
1	8



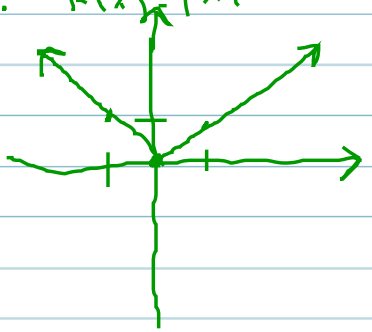
(2) $y = |x-2| - 4$



★ Vertical and Horizontal Shrinking and Stretching

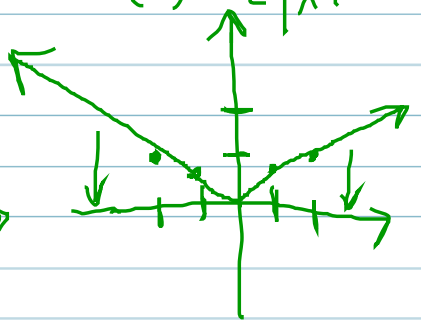
- Vertical: To Stretch away from the x-axis, Multiply the equation by a where $a > 1$.
- To Shrink away from the x-axis, multiply its equation by a, where $0 < a < 1$.

ex: $f(x) = |x|$



$g(x) = 2|x|$

$h(x) = \frac{1}{2}|x|$

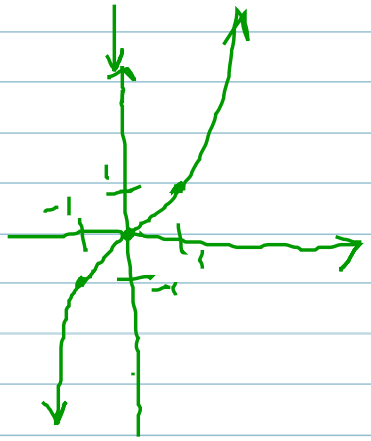


- Horizontal - To Shrink towards the $\neq$-axis, replace each x with (ax) where $a > 1$

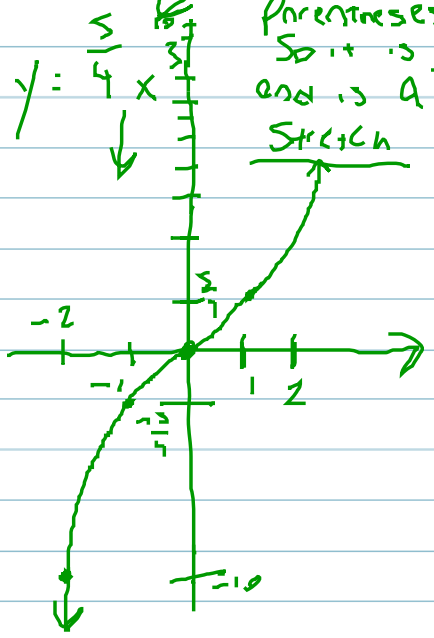
- To Stretch away from the $\neq$-axis, replace each x with (ax) where $0 < a < 1$.

- When you perform a horizontal Stretch or Shrink, divide each x Coordinate by a

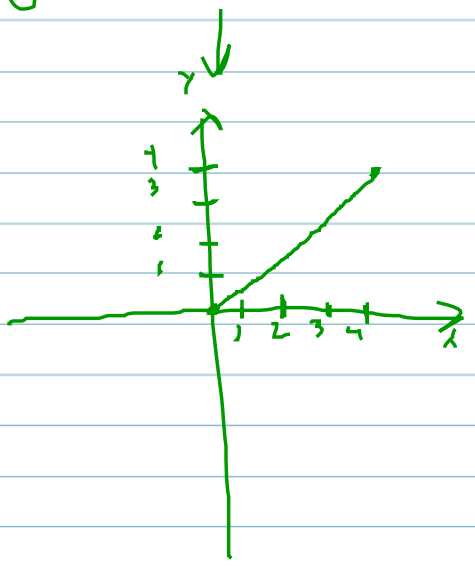
(2) $y = \frac{5}{4}x^3$



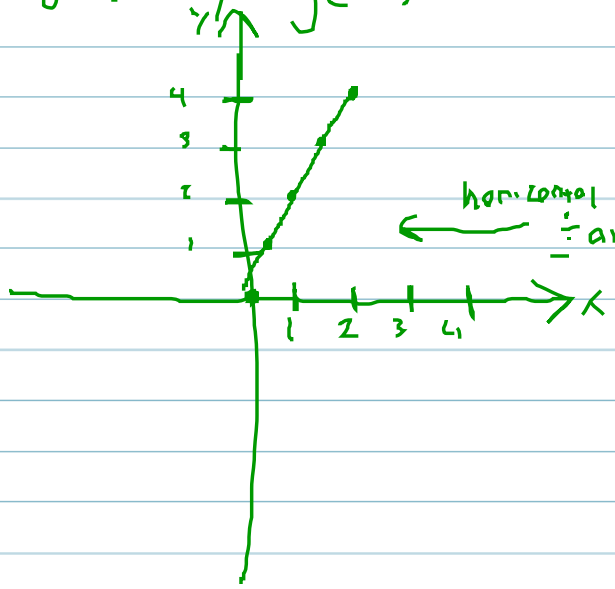
This is NOT in parentheses with x, So it is outside and is a vertical Stretch



(6) graph of $y = g(x)$



graph $y = g(2x)$



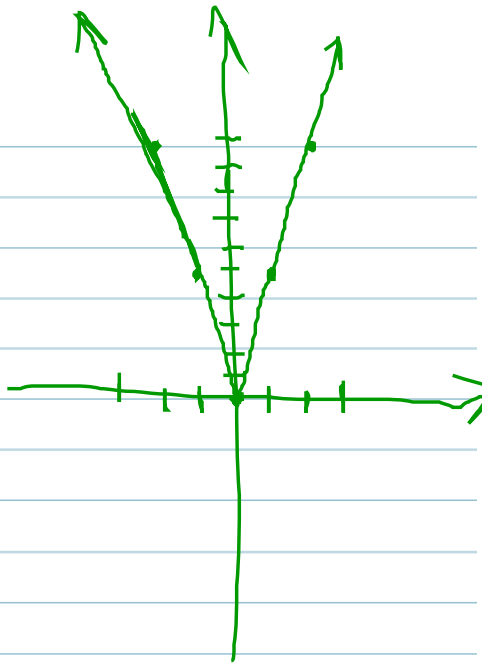
horizontal Shrink ÷ all x by 2

① $y = 5|x|$

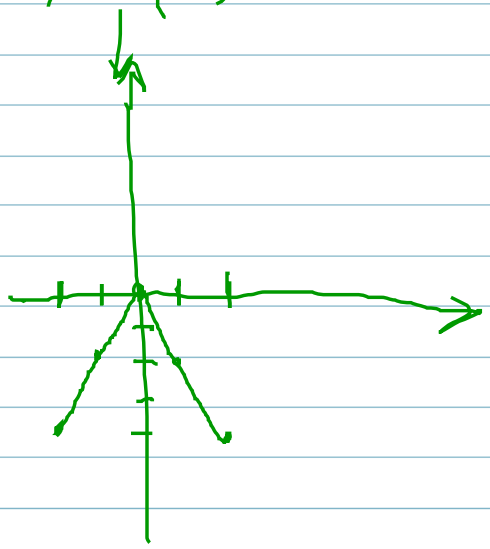
$y = \lvert x \rvert$	
x	y
-2	2
-1	1
0	0
1	1
2	2

→

$y = 5\lvert x \rvert$	
x	y
-2	± 10
-1	5
0	0
1	5
2	10



⑤ $y = f(x)$

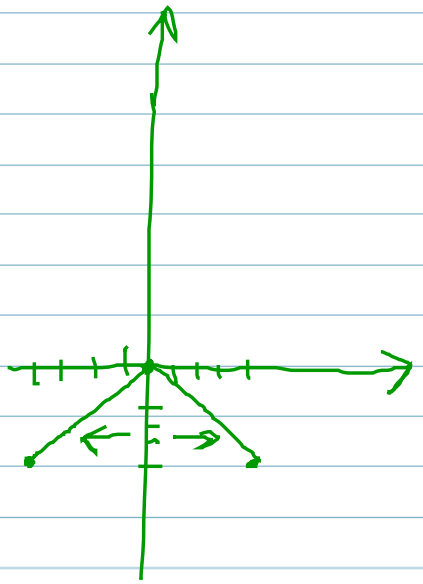


→ $y = f\left(\frac{1}{2}x\right)$

x	y
-2	-4
0	0
2	-4

→

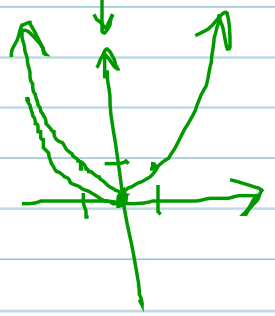
x	y
-4	-4
0	0
4	-4



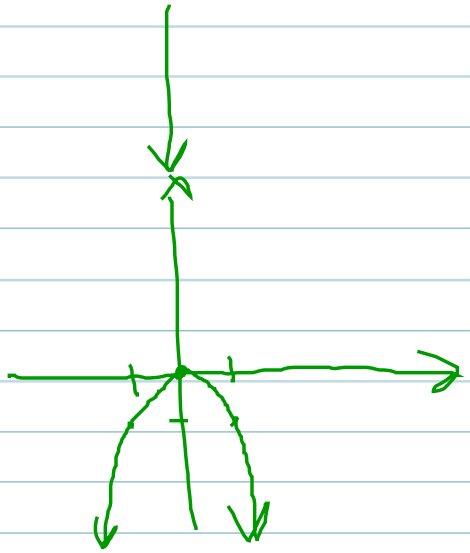
★ Applying Reflections across the x- and y- axes.

- To reflect (spin) a graph across the x-axis multiply its equation by -1 on the right side only.
- To reflect a graph across the y-axis, ~~multiply~~ replace all x with $(-x)$.

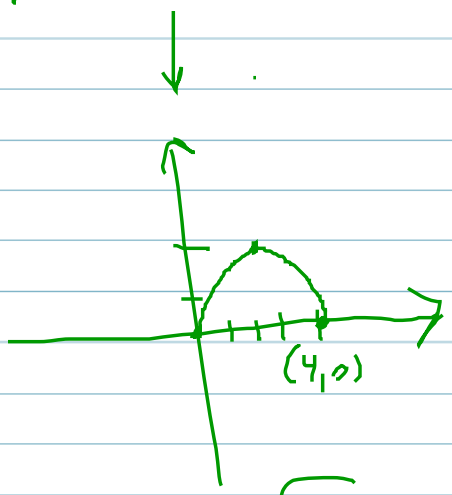
ex) $f(x) = x^2$



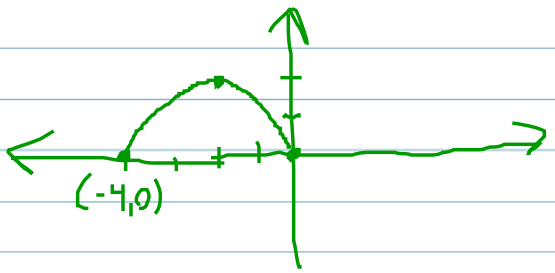
$f(x) = -x^2$



(3) $y = f(x)$, show

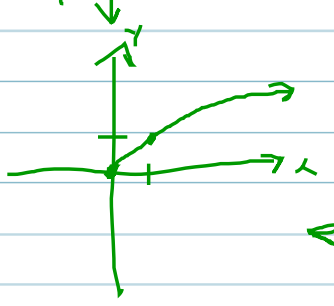
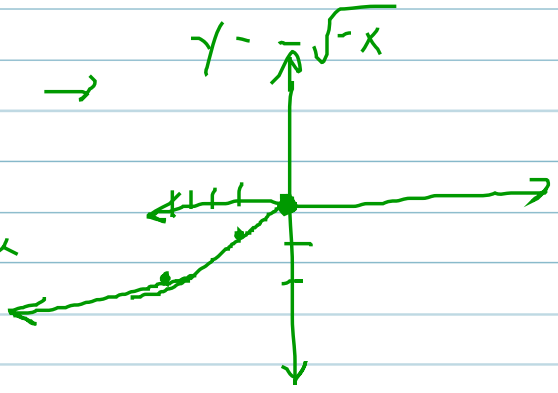


$y = f(-x)$



(11) $y = -\sqrt{-x}$

$y = \sqrt{x}$



$y = -\sqrt{-x}$