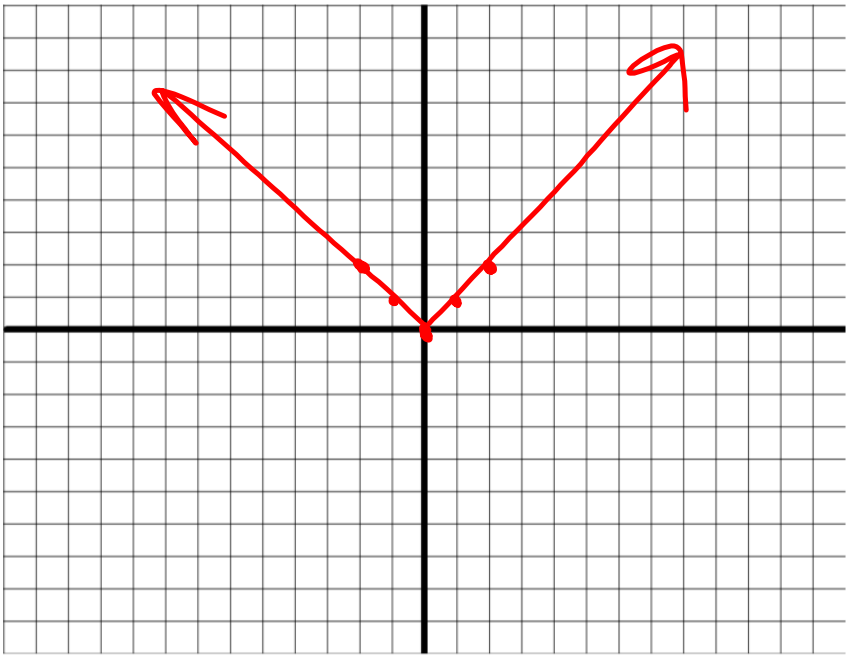
2.7 Use Absolute Value Functions and Transformations

Parent Function: $y = |x|$

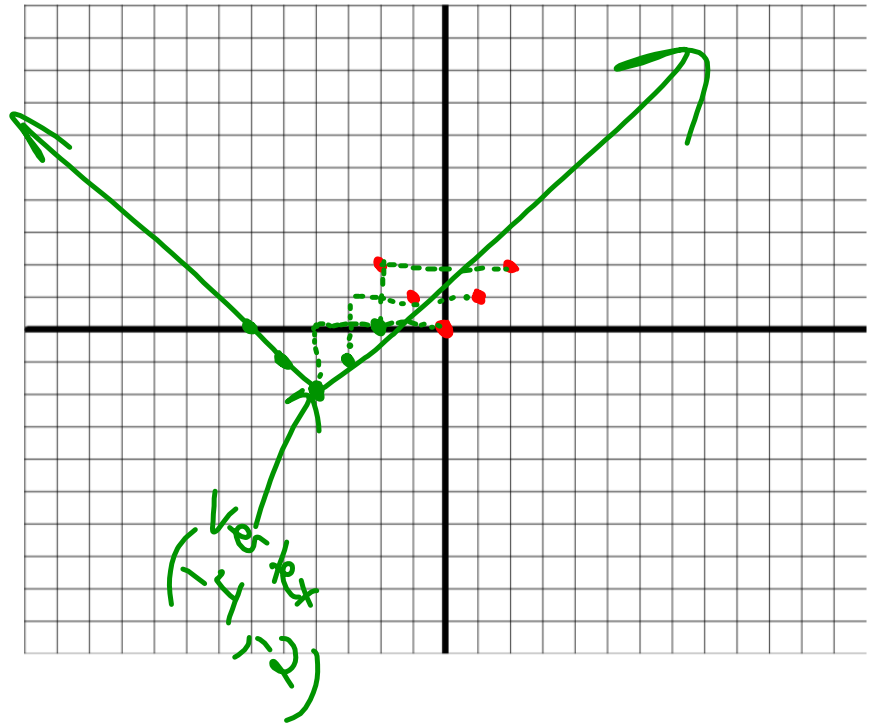


EXAMPLE 1 Graph a function of the form $y = |x - h| + k$

Graph $y = |x + 4| - 2$. Compare the graph with the graph of $y = |x|$.

h = -4
left 4

k = -2
down 2

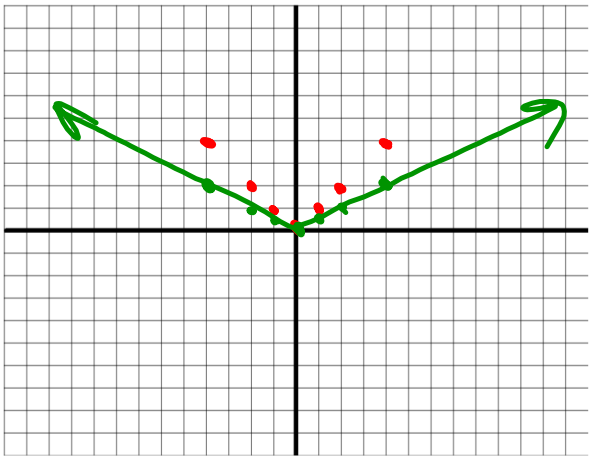


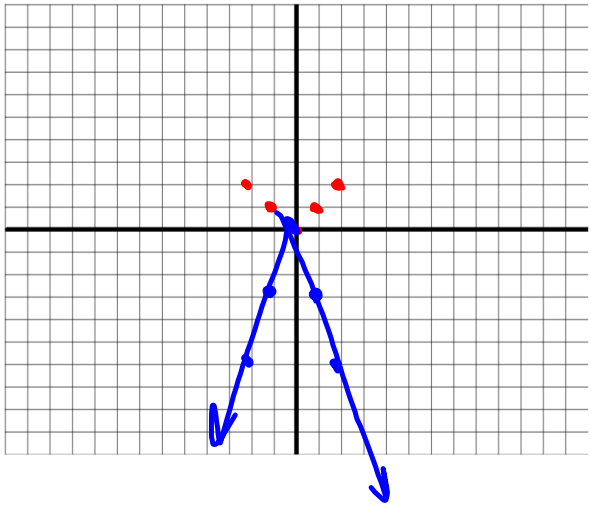
EXAMPLE 2 **Graph functions of the form $y = a|x|$**

Graph (a) $y = \frac{1}{2}|x|$ and (b) $y = -3|x|$.

Compress of $\frac{1}{2}$

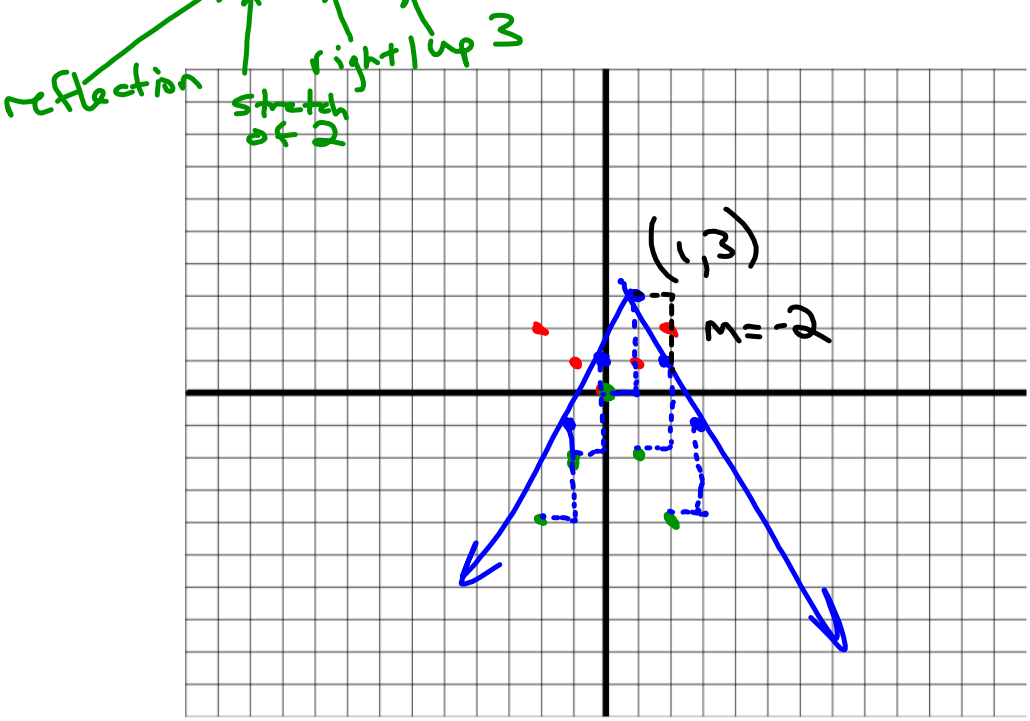
stretch of 3 reflection





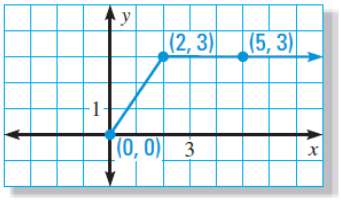
EXAMPLE 3 **Graph a function of the form $y = a|x - h| + k$**

Graph $y = -2|x - 1| + 3$. Compare the graph with the graph of $y = |x|$.

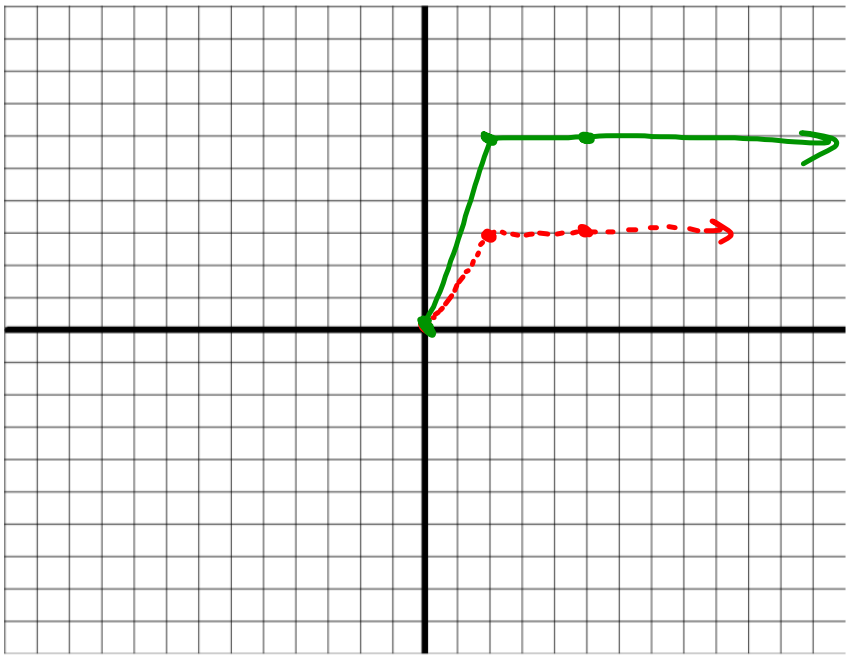


EXAMPLE 5 Apply transformations to a graph

The graph of a function $y = f(x)$ is shown. Sketch the graph of the given function.



a. $y = 2 \cdot f(x)$



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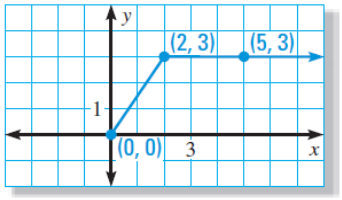
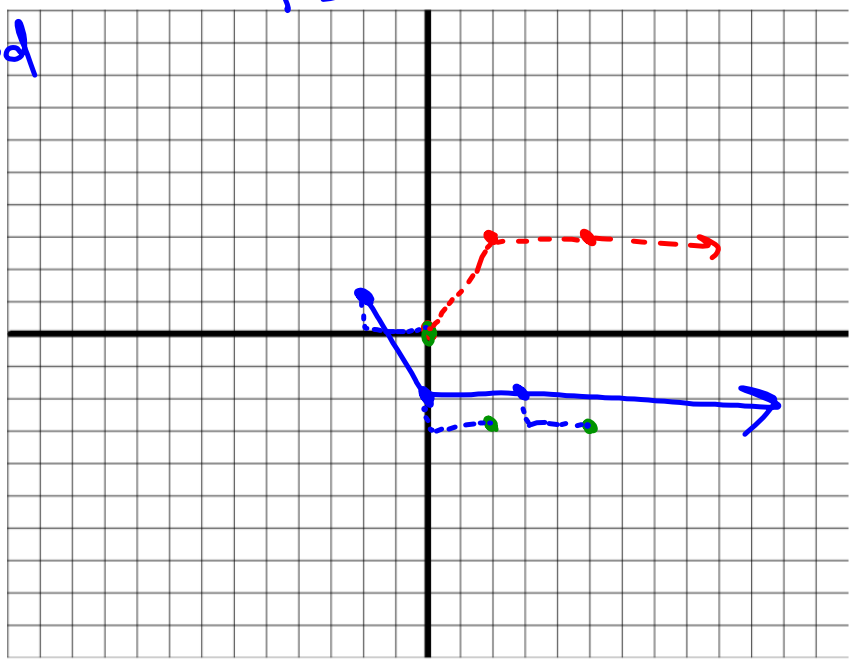


b. $y = -f(x + 2) + 1$

flipped left 2 up 1



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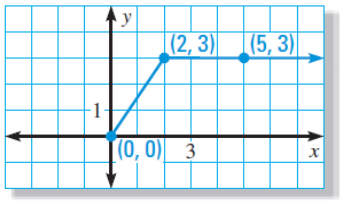

$$y = 2 \cdot f(x + 3) - 1$$

Stretch of 2 left 3 down 1