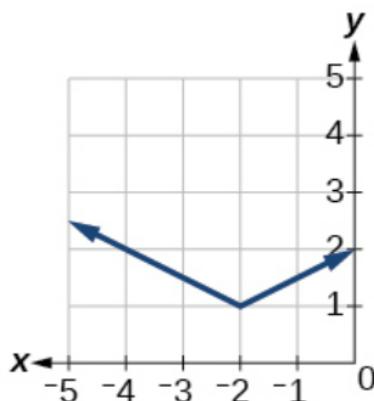# Exercise 63

For the following exercises, write an equation for the transformation of $f(x) = |x|$.

Solution

Notice that this graph of the absolute value function has not only been shifted to the left by 2 units and up by 1 unit, but also has been vertically compressed by a factor of $1/2$. Begin with the parent function.

$$|x|$$

Multiply it by $1/2$ to vertically compress it by a factor of $1/2$.

$$\frac{1}{2}|x|$$

Replace x with $x + 2$ to shift the graph to the left by 2 units.

$$\frac{1}{2}|x + 2|$$

Add 1 to shift the graph up by 1 unit.

$$y = \frac{1}{2}|x + 2| + 1$$