

Algebra 2

Lesson 2-5: Absolute Value Functions and Graphs,

Vertical Stretch/Vertical Shrink

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Last class we saw how the (h, k) values affected the absolute value function. Today, we are going to look at the effects of the leading coefficient " a ."

The parent function is

$$y = |x|$$

General form:

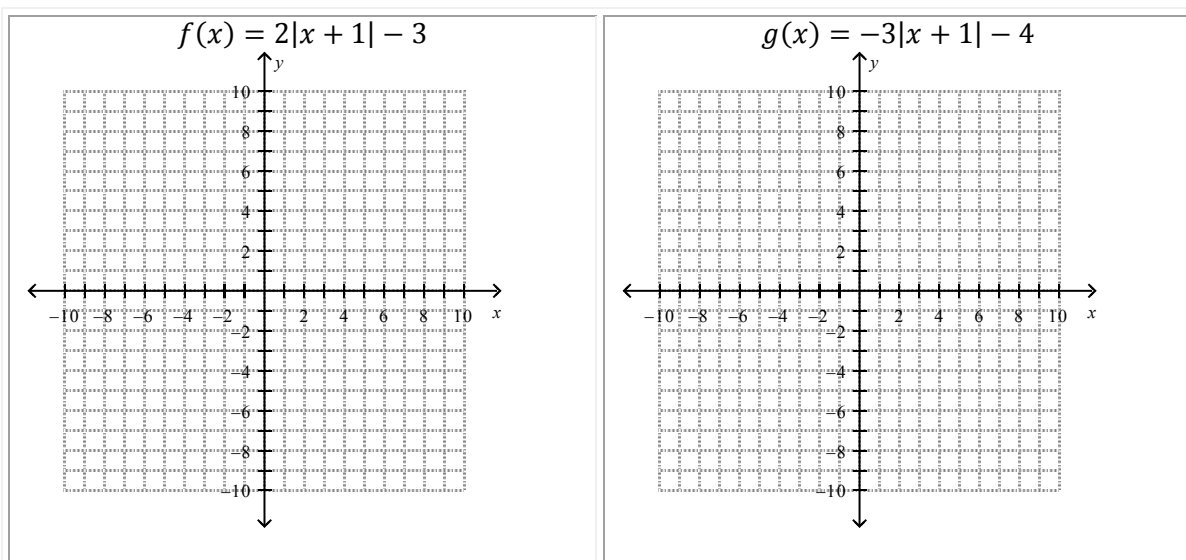
$$f(x) = a|x - h| + k$$

Vertex is: (h, k)

In Algebra I the slope of the line is identified as m , the slope is the vertical stretch/shrink of a line. It manifests itself as a steepening or flattening of the line. In an absolute value function the leading coefficient will stretch or shrink the absolute value. The effect is like that of a line.

- $+a$ is a vertical stretch. The sides of the AV will get steeper by a factor of a .
- $-a$ is a vertical shrink. The sides of the AV will get flatter by a factor of a .

Graph and state the domain and range.



Given the form:

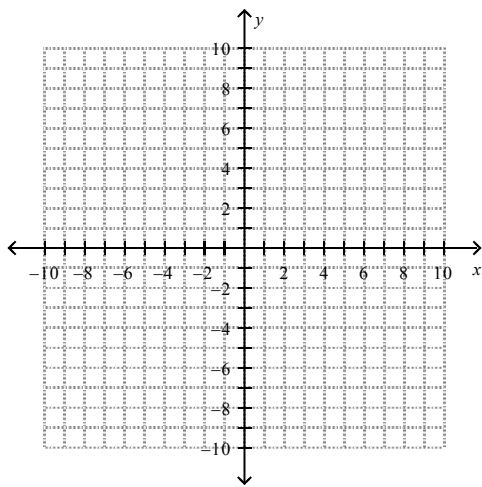
$$y = |mx + b| + c$$

$$\text{vertex: } \left(-\frac{b}{m}, c\right)$$

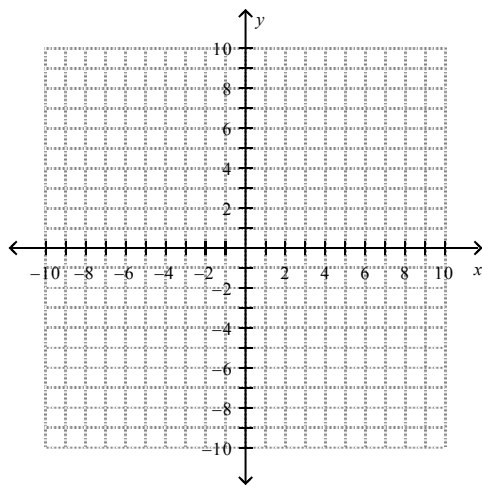
Sometimes the absolute value will have a coefficient next to the x-variable. Here we use the above listed form to determine the vertex. To graph make a table of values; choose points on each side of the vertex.

Find the vertex and graph.

$$y = |3x + 6|$$



$$y = |-2x + 6| - 3$$



What is the equation for the graph:

