

What Equation Makes This Graph?

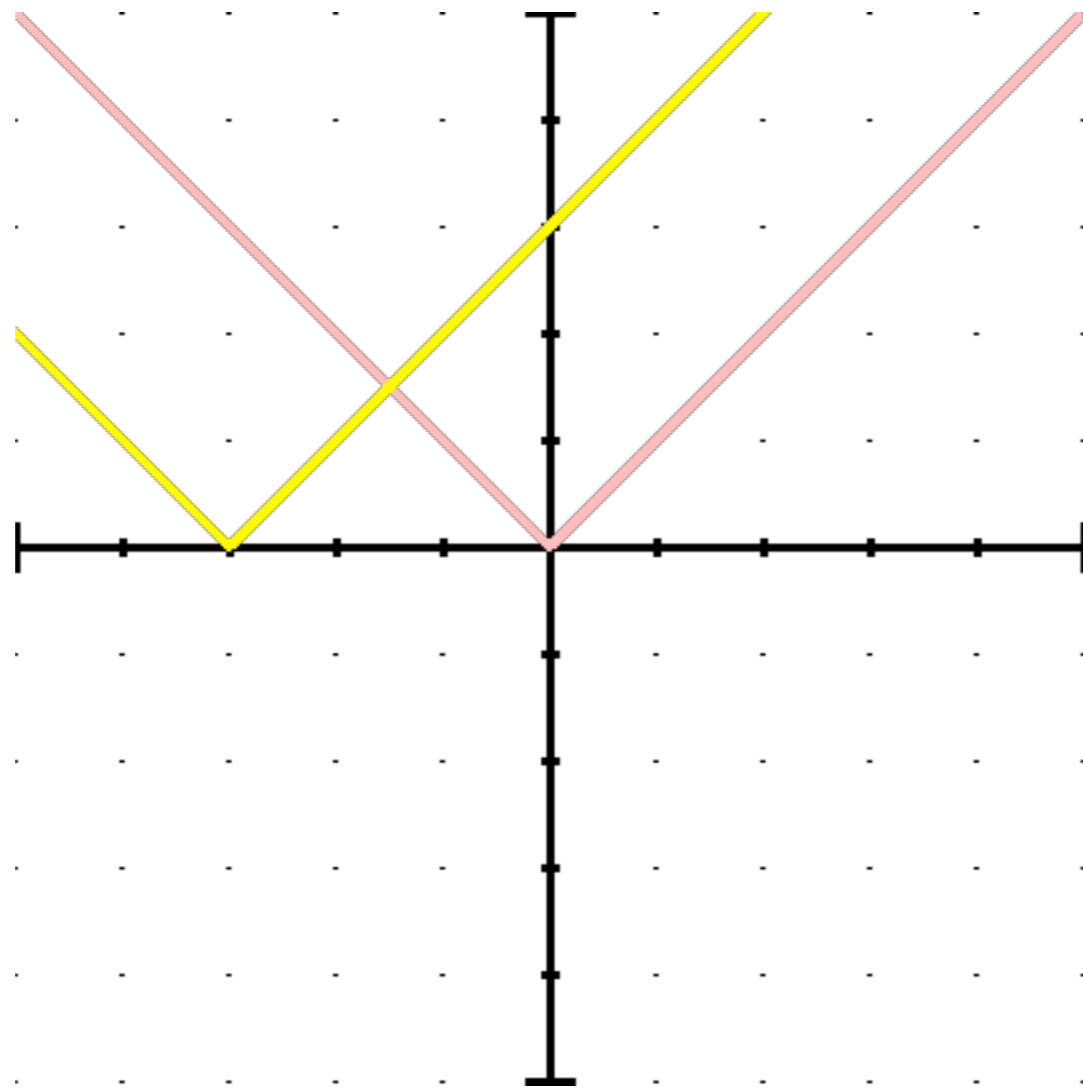
by Mr. F

Horizontal Shifts

"parent function"

$$y = |x|$$

$$y = |x + 3|$$



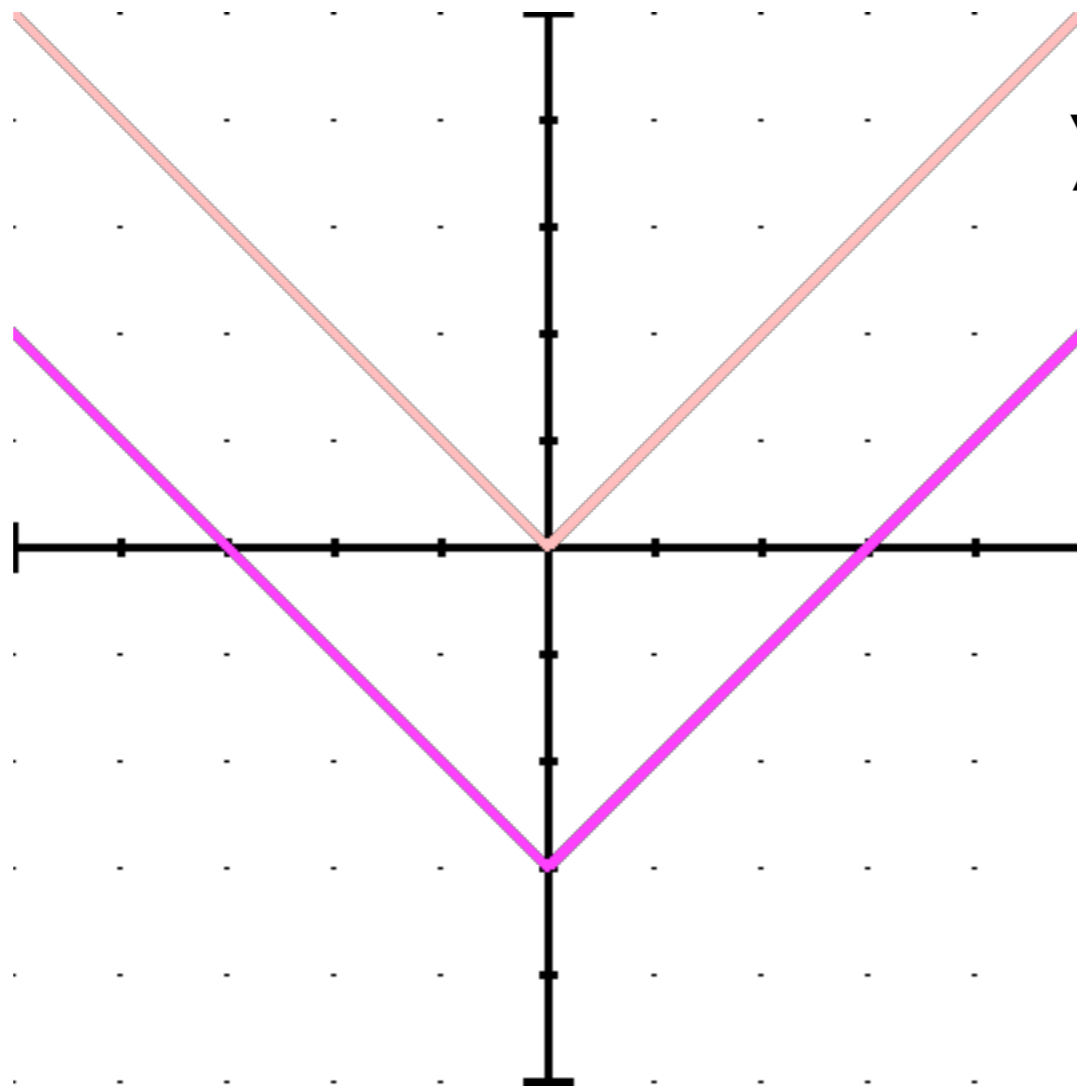
Add to x shifts the vertex to the left

Subtracting from x shifts the vertex to the right

Vertical Shifts

"parent
function"

$$y = |x| - 3$$

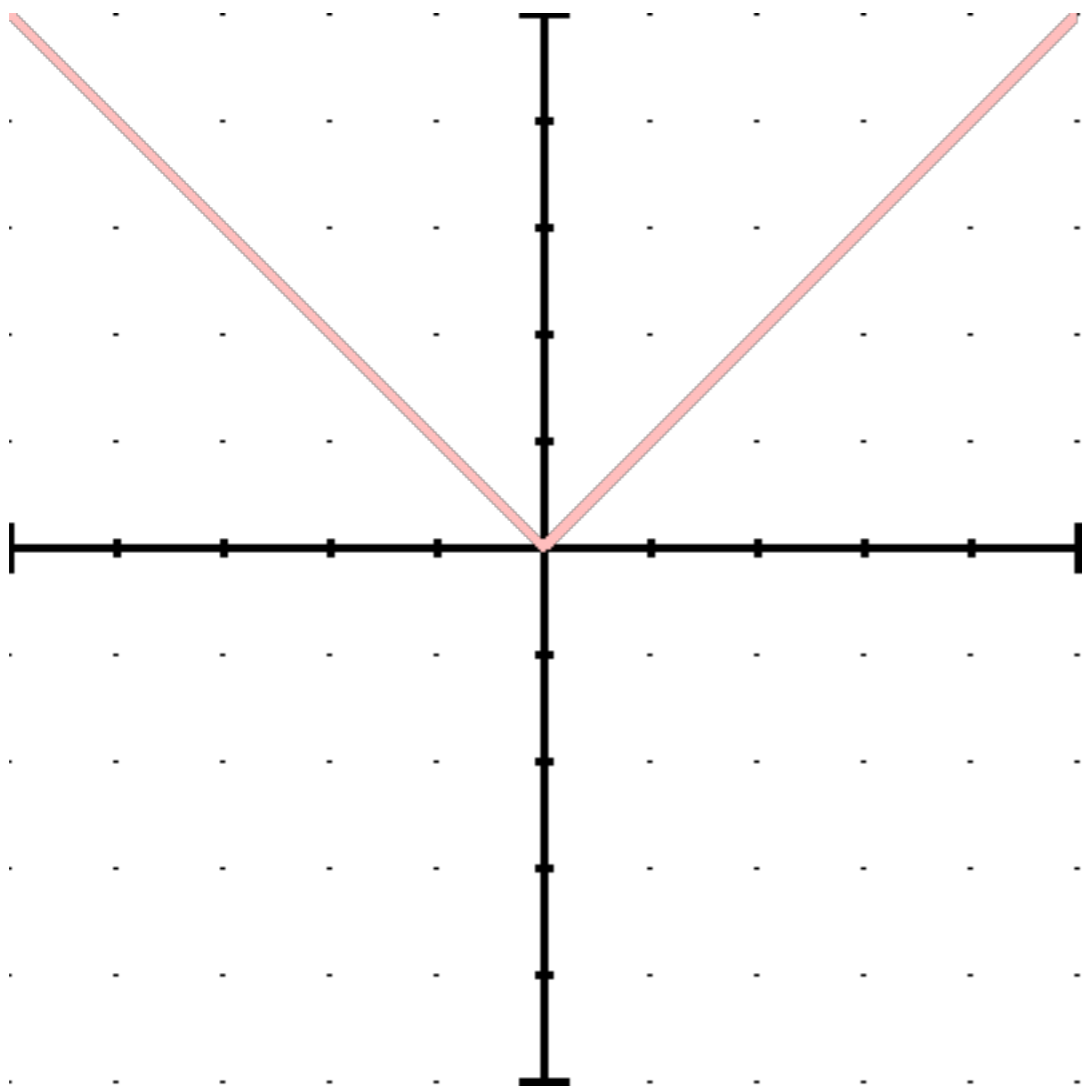


$$y = |x|$$

Add on outside
shifts vertex up

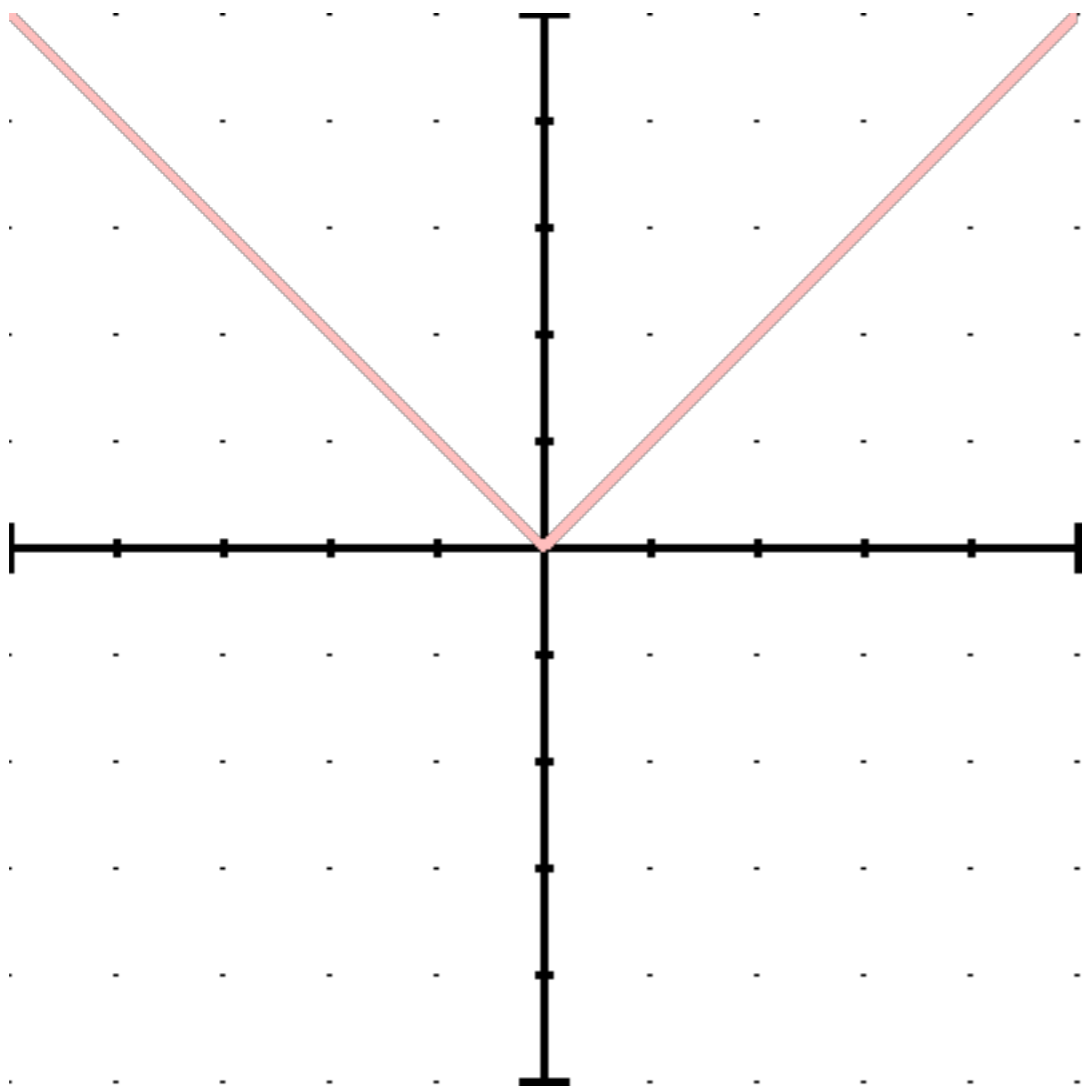
Subtract on outside
shifts vertex down

Where will the vertex go?



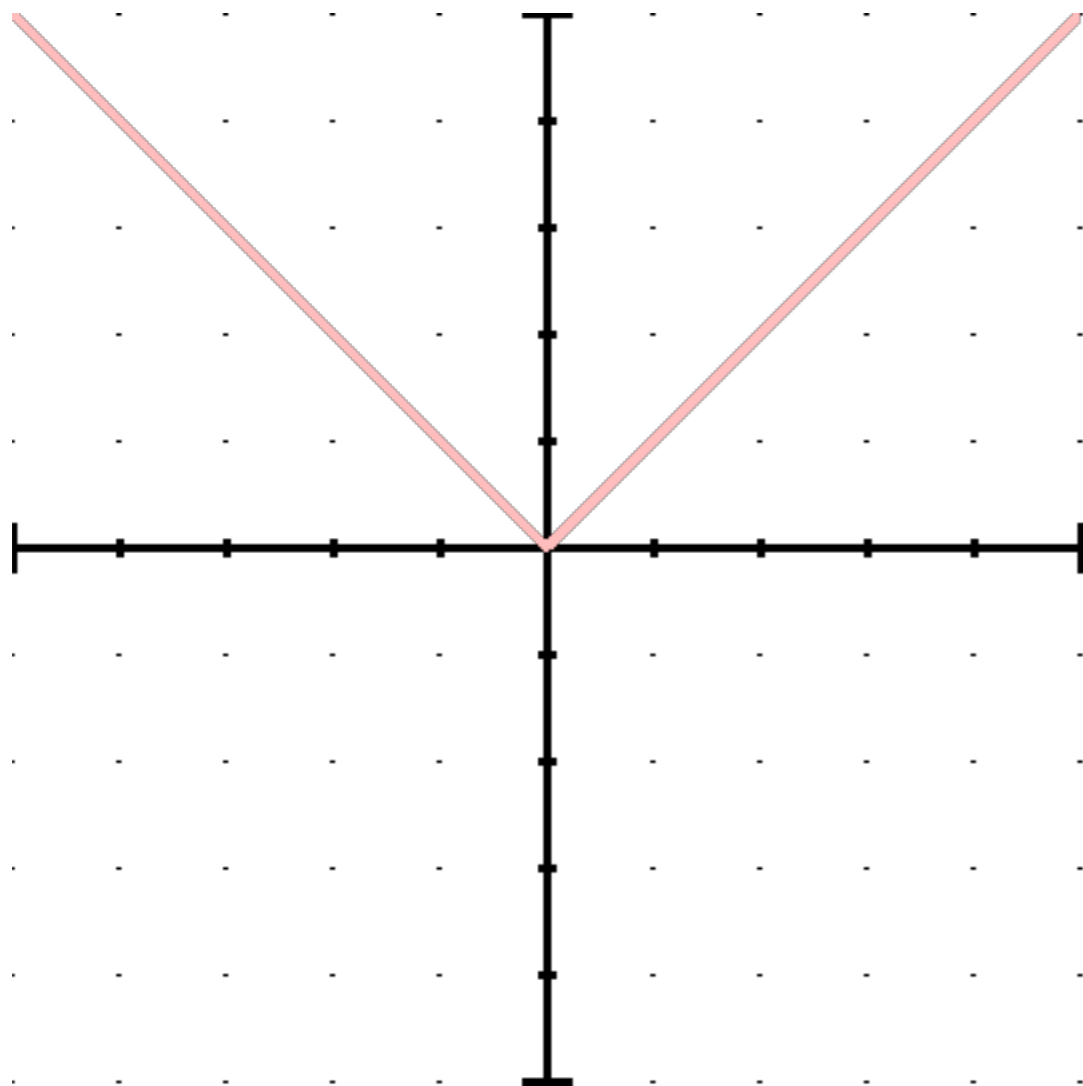
Where will the vertex go?

$$y = |x - 1| - 2$$



Where will the vertex go?

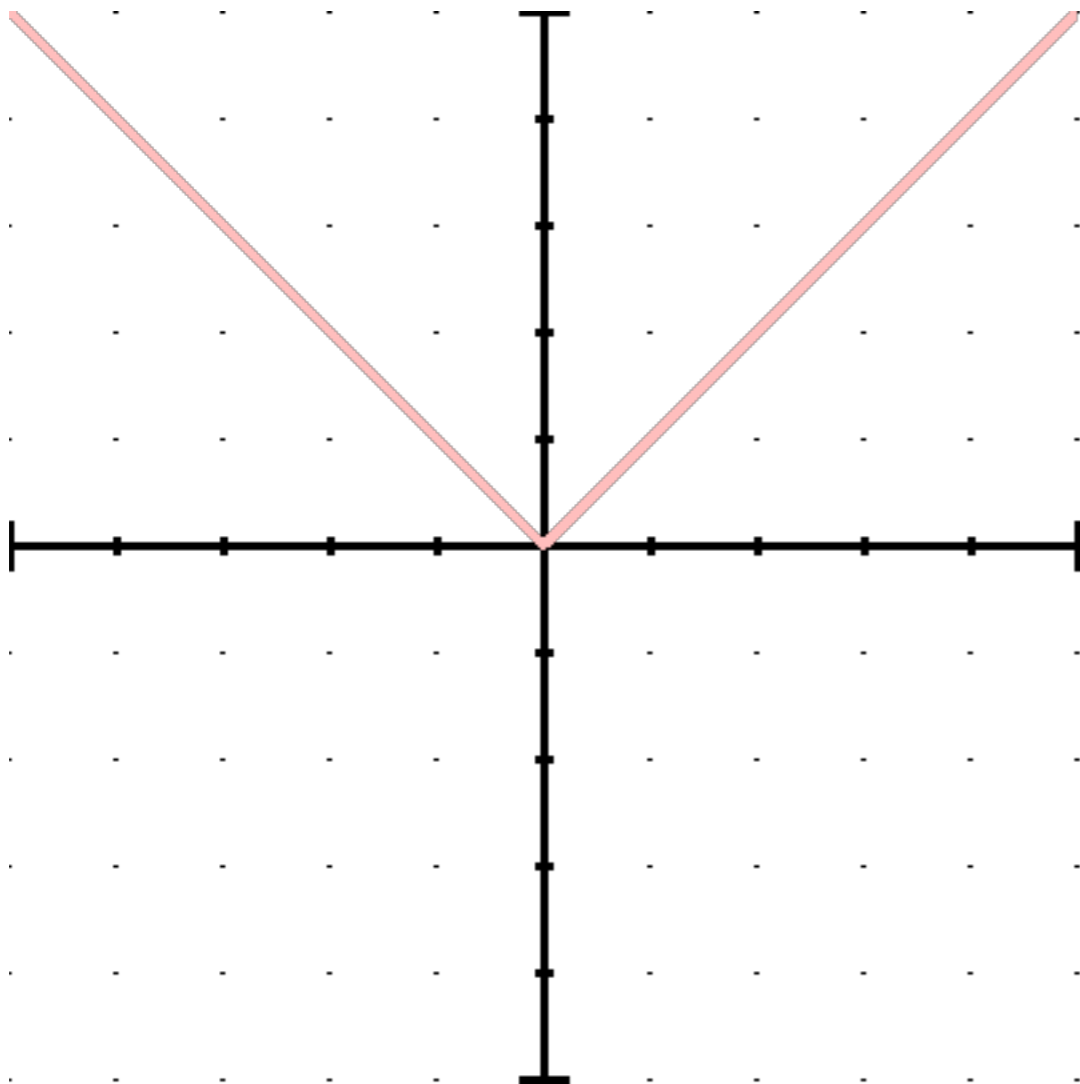
$$y = |x|$$



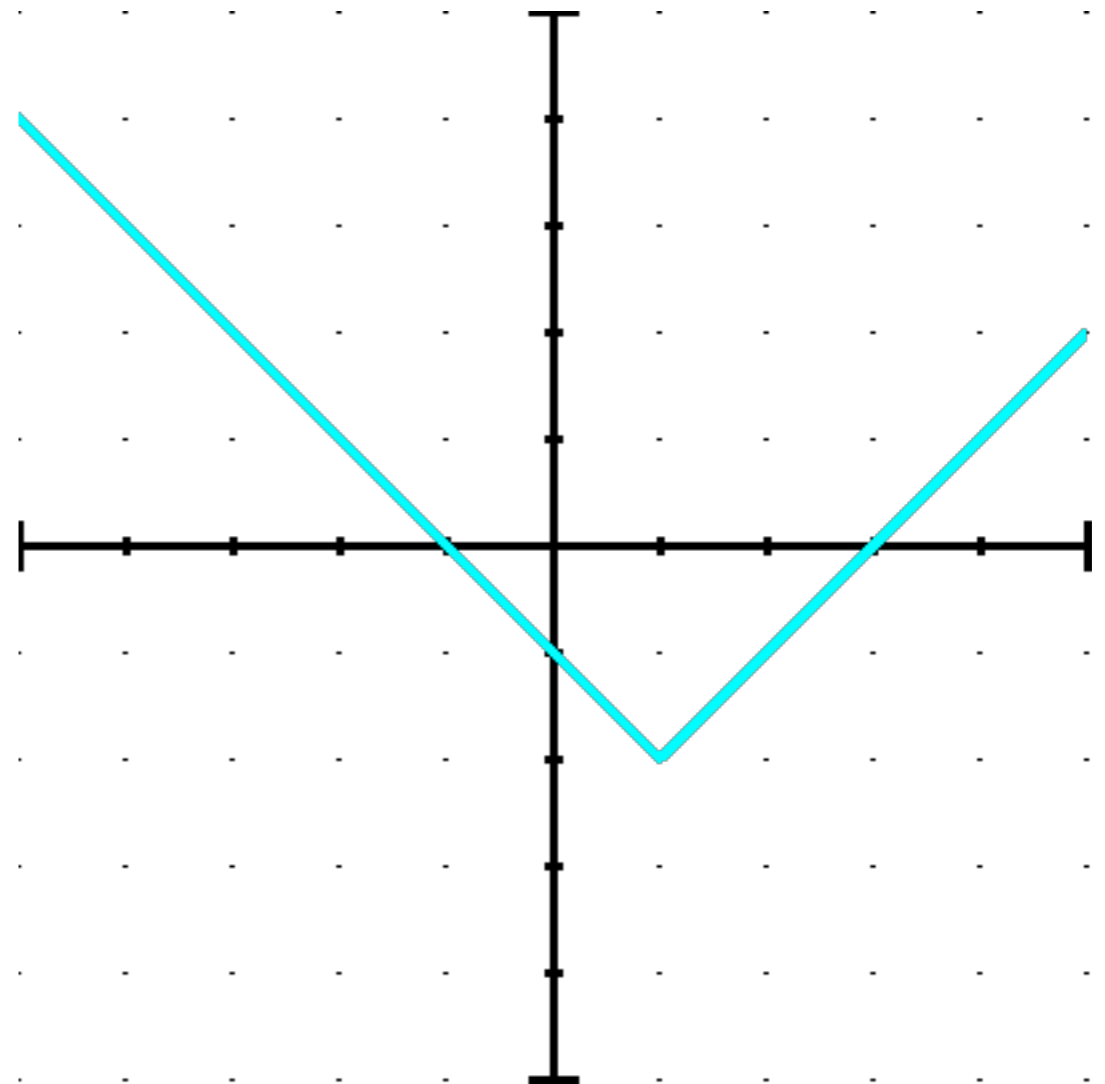
$$y = |x - 1| - 2$$

Where will the vertex go?

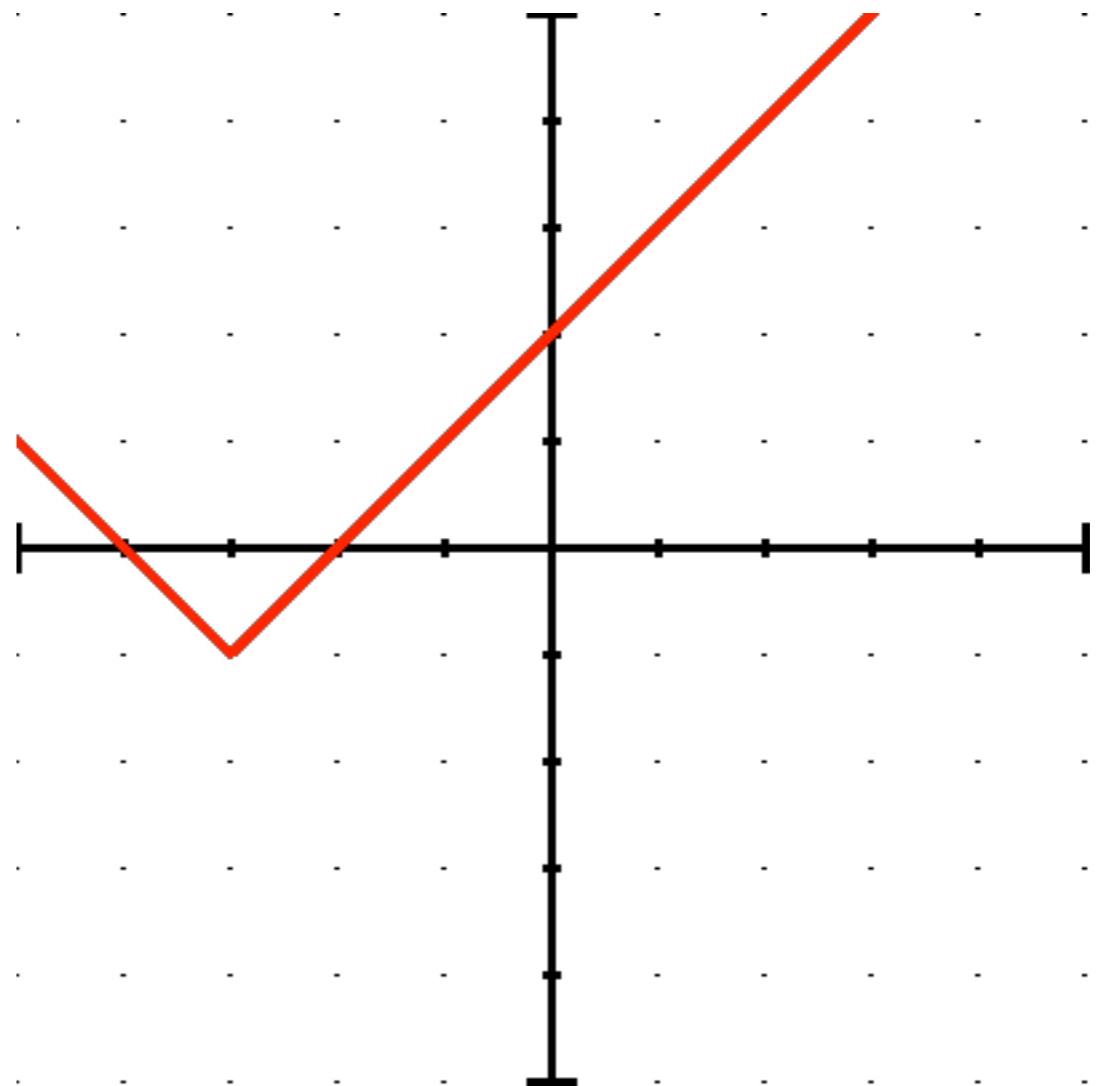
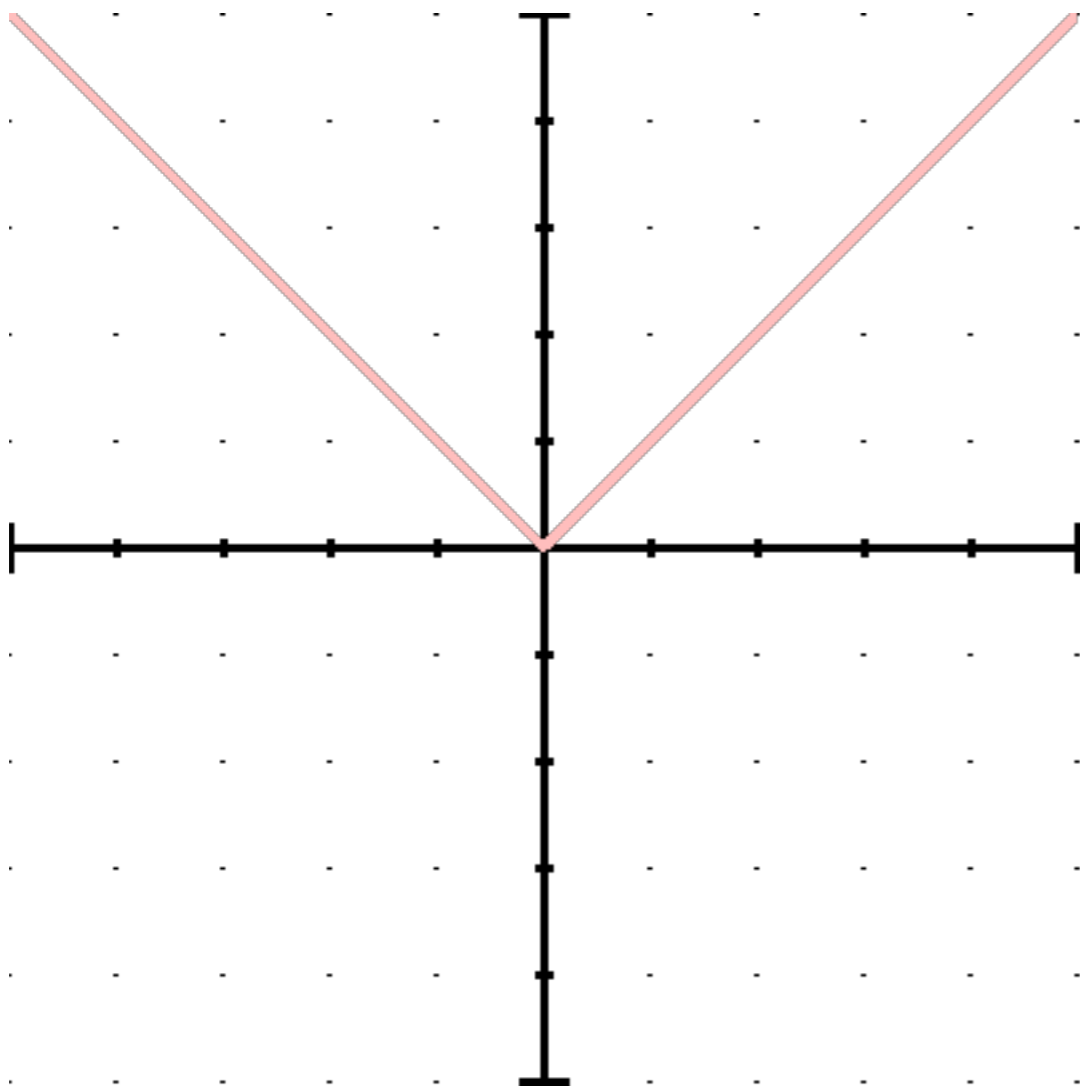
$$y = |x|$$



$$y = |x - 1| - 2$$

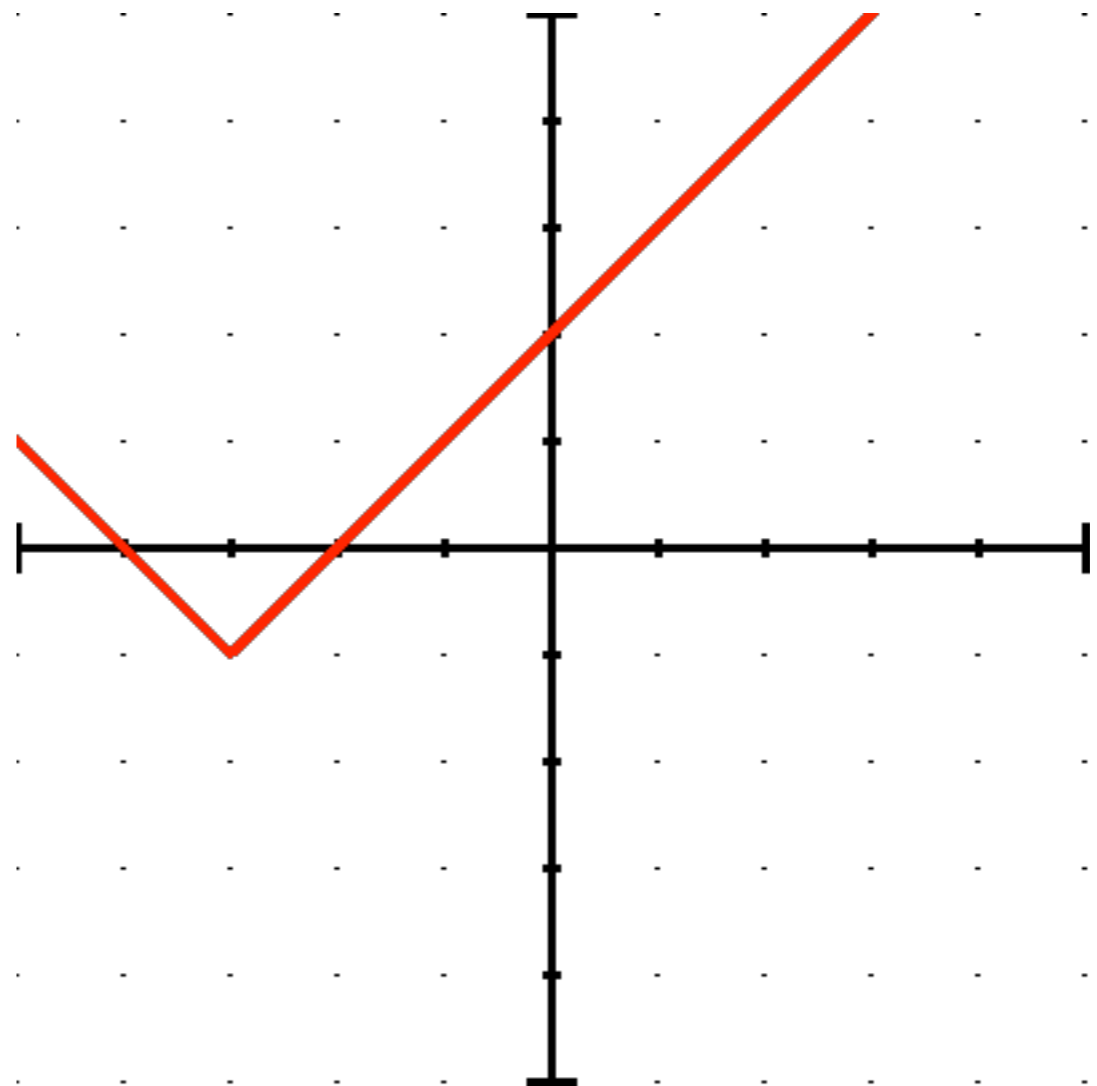
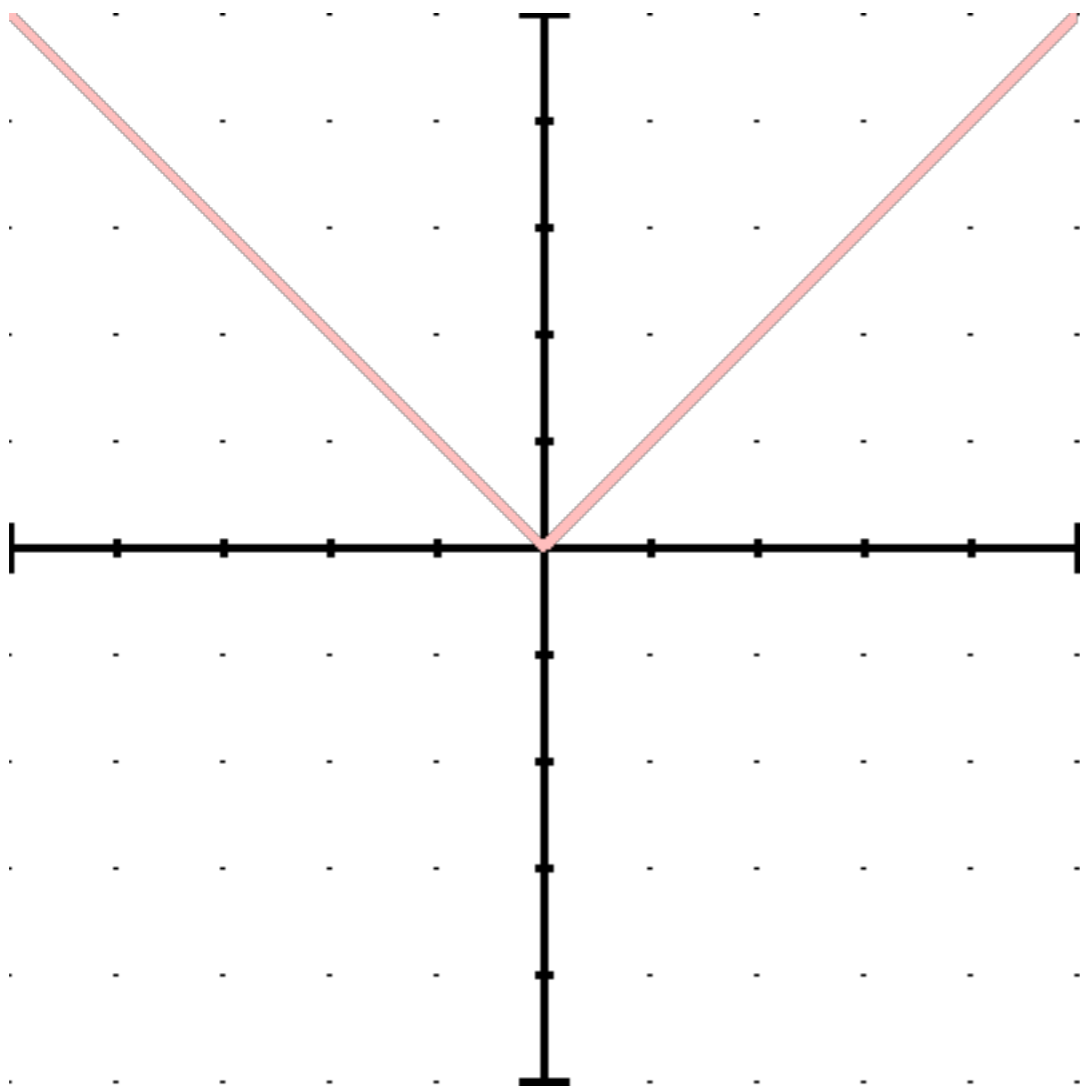


Where will the vertex go?



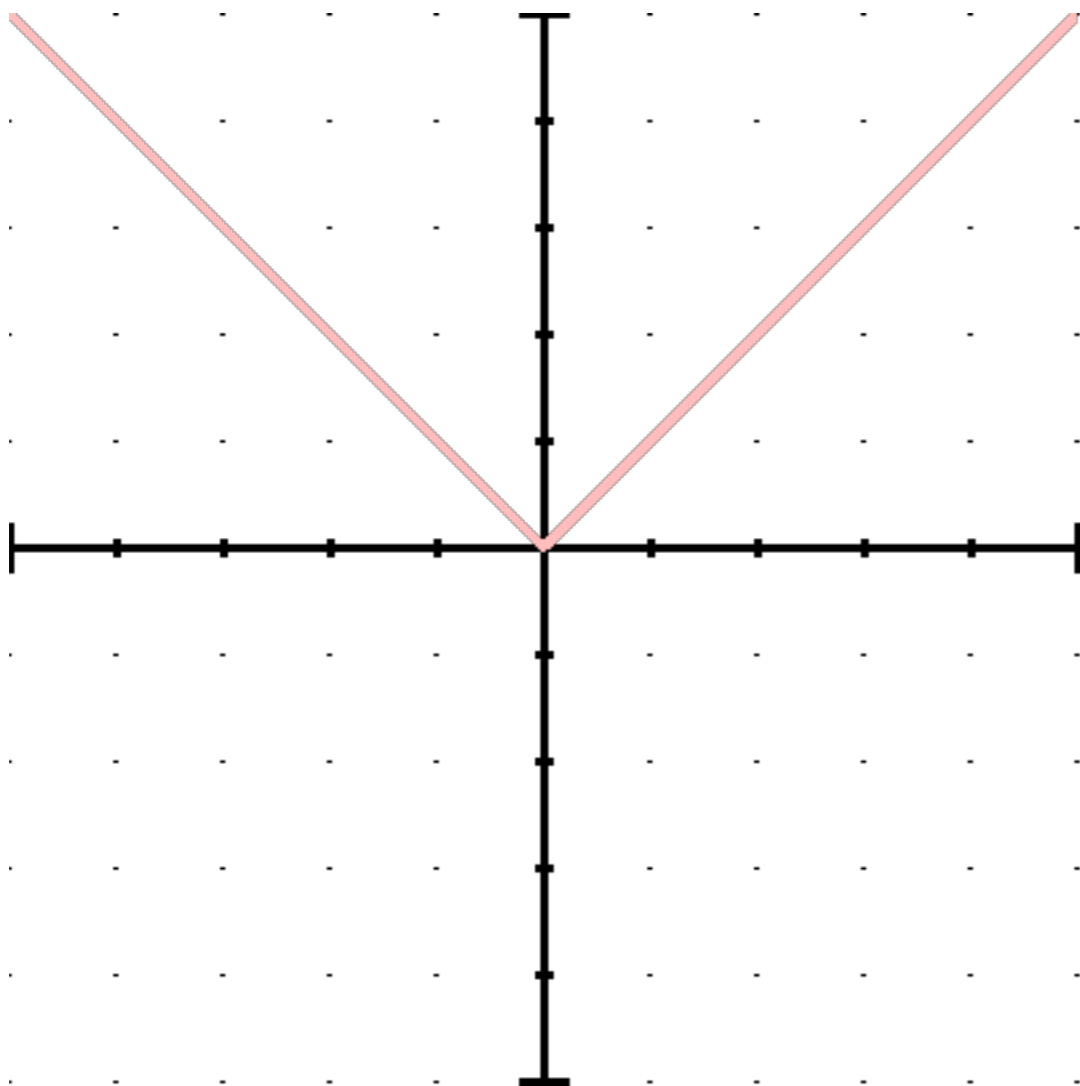
Where will the vertex go?

$$y = |x + 3| - 1$$

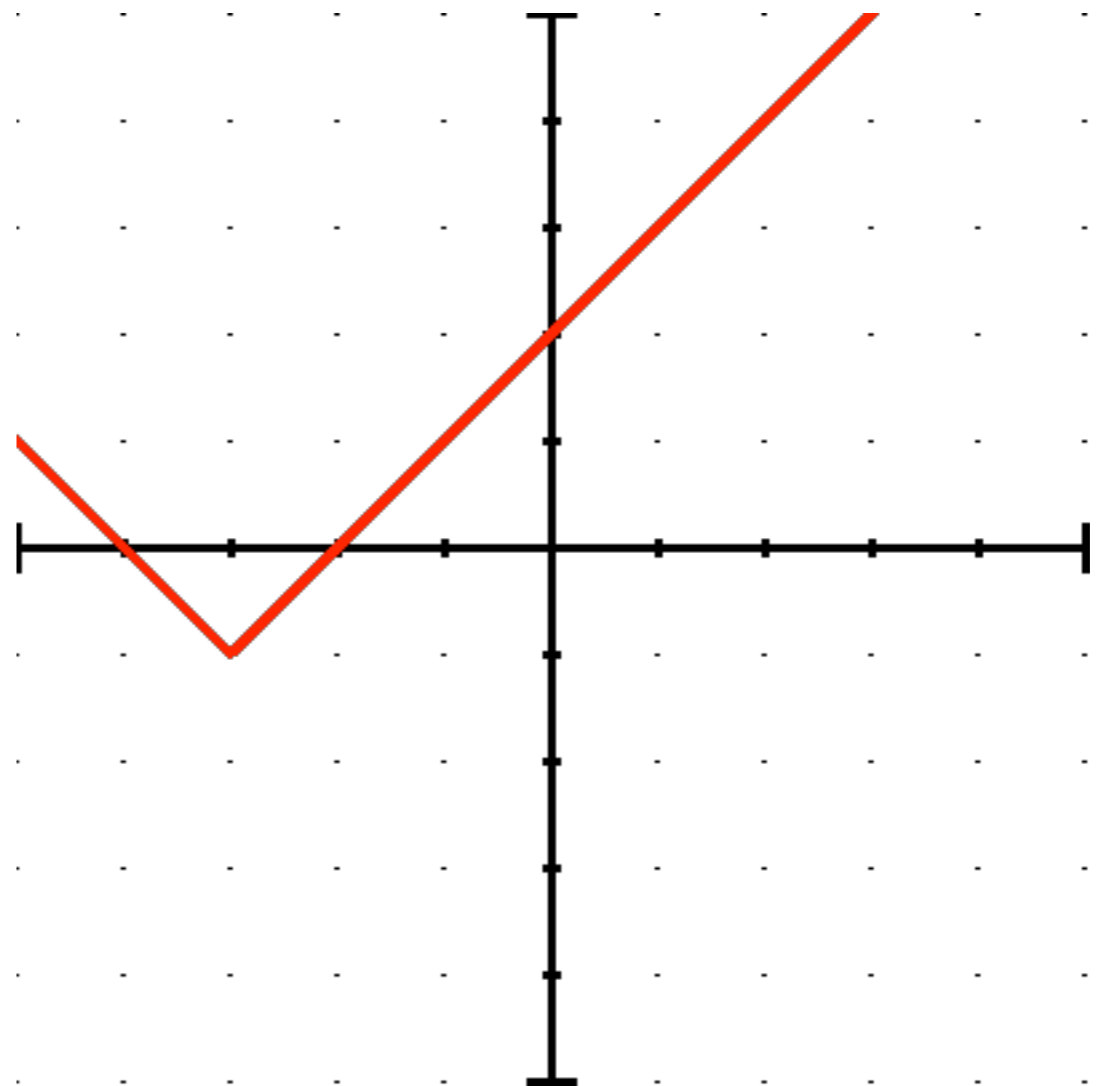


Where will the vertex go?

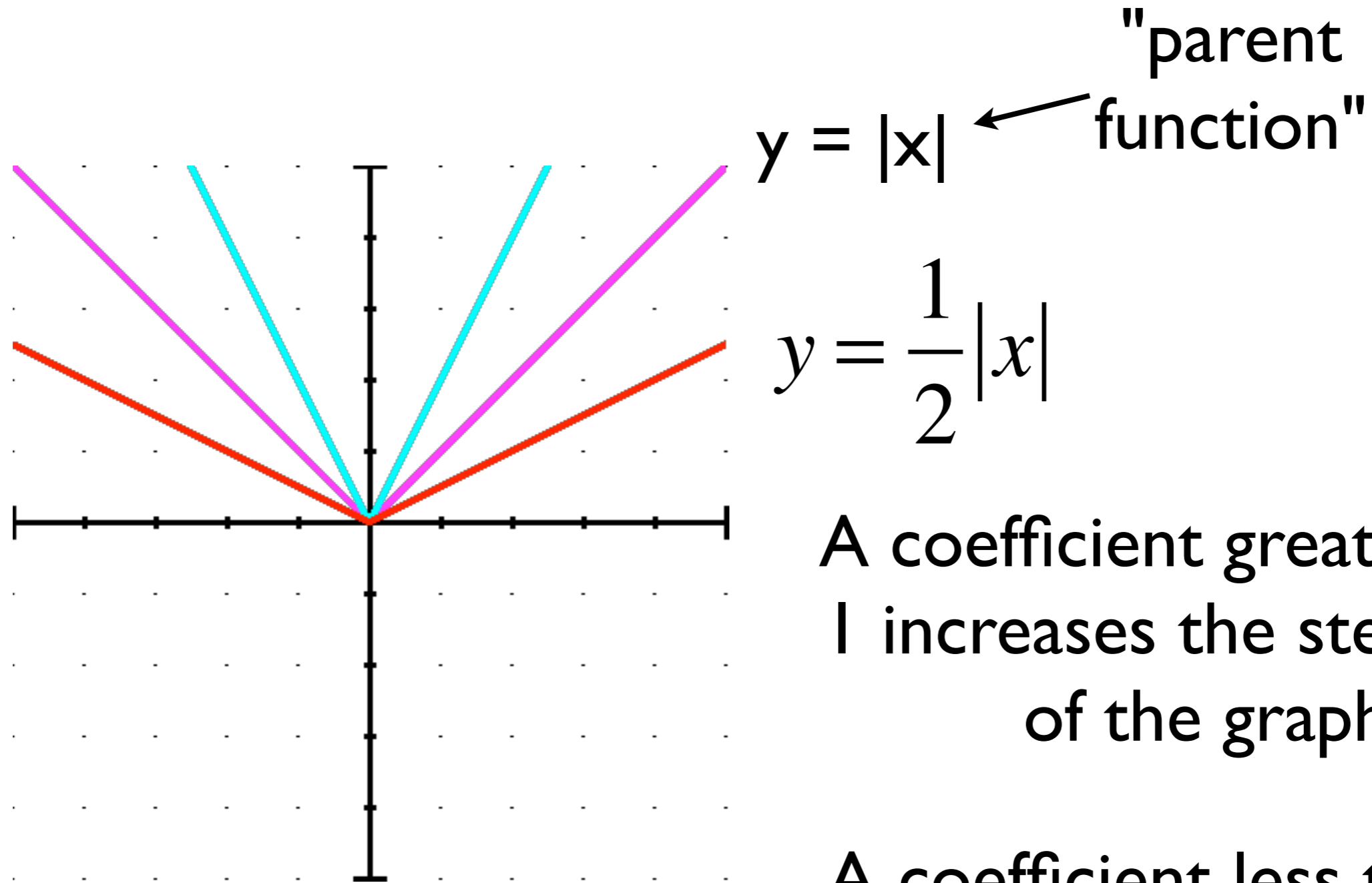
$$y = |x|$$



$$y = |x + 3| - 1$$



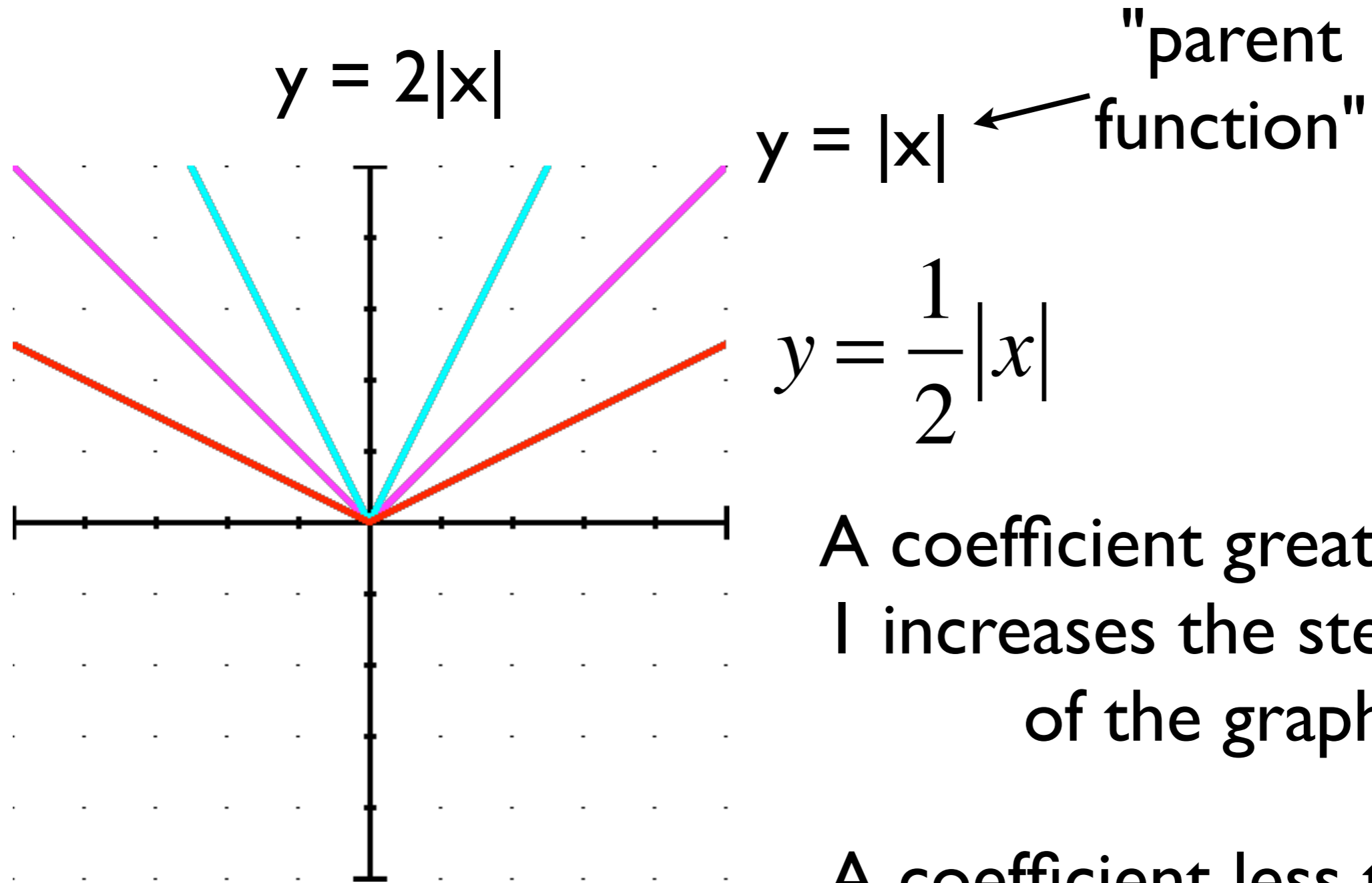
Vertical Stretches



A coefficient greater than 1 increases the steepness of the graph

A coefficient less than 1 decreases the steepness of the graph

Vertical Stretches

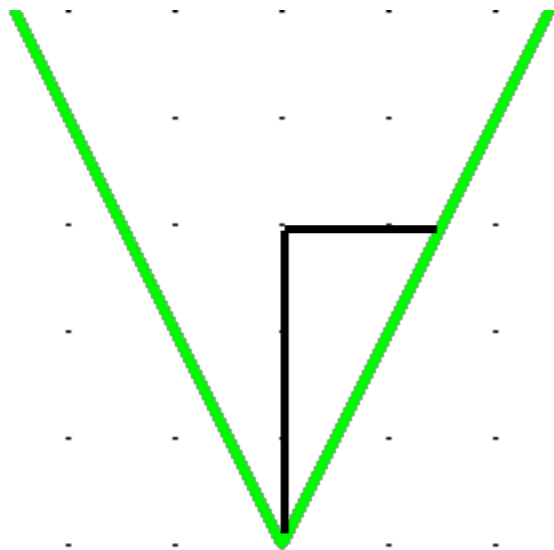


A coefficient greater than 1 increases the steepness of the graph

A coefficient less than 1 decreases the steepness of the graph

All together

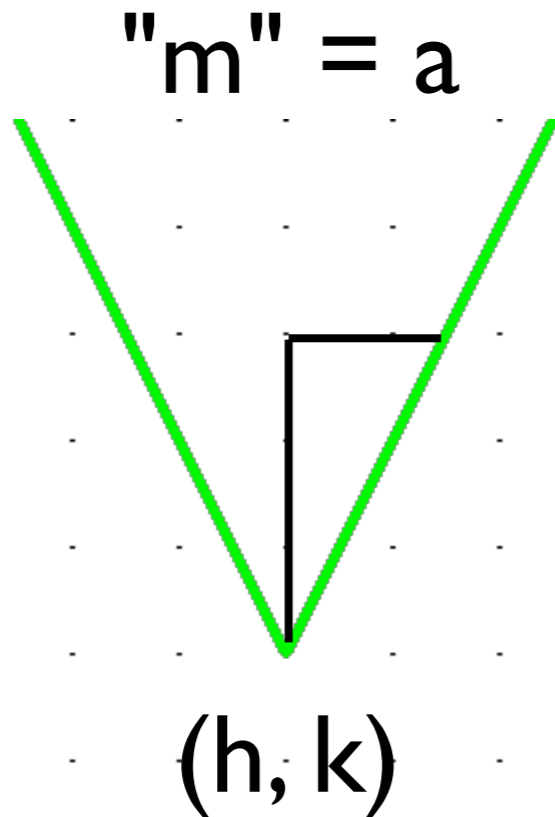
"m" = a



(h, k)

$$y = a|x - h| + k$$

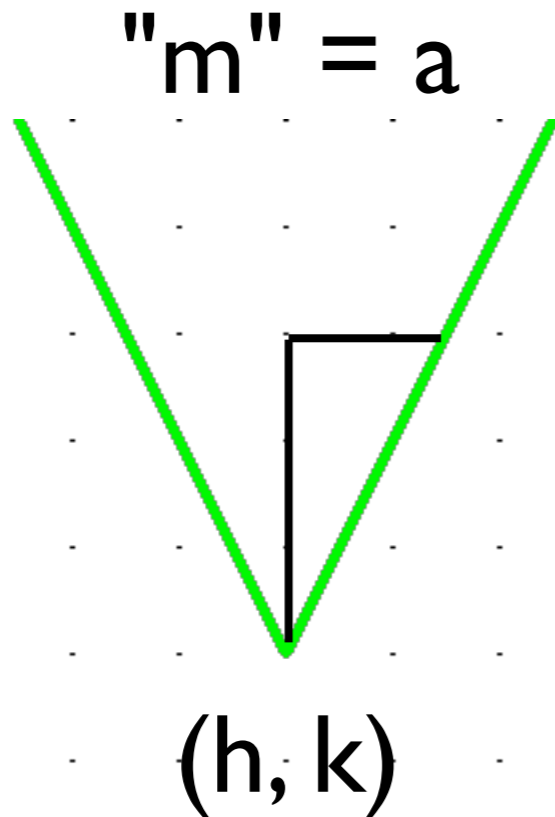
All together



$$y = a|x - h| + k$$

- a - the vertical stretch

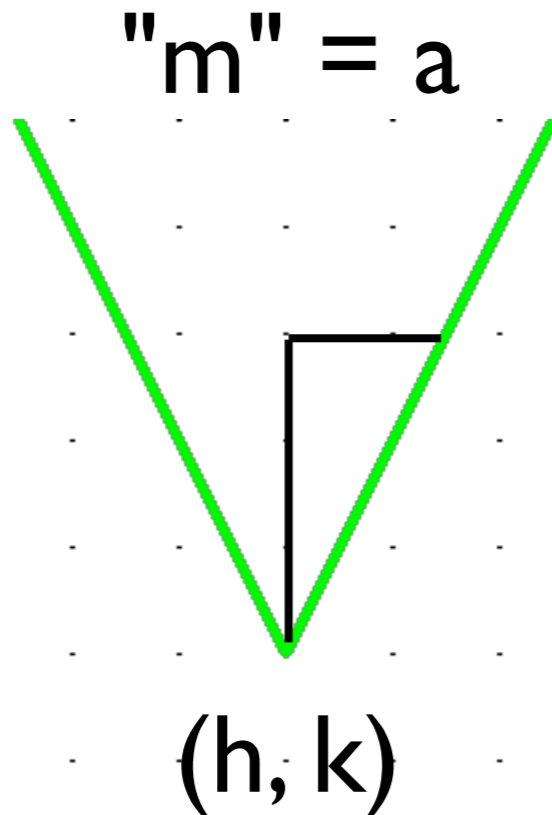
All together



$$y = a|x - h| + k$$

- a - the vertical stretch
- h - the x -coordinate of the vertex (horizontal shift)

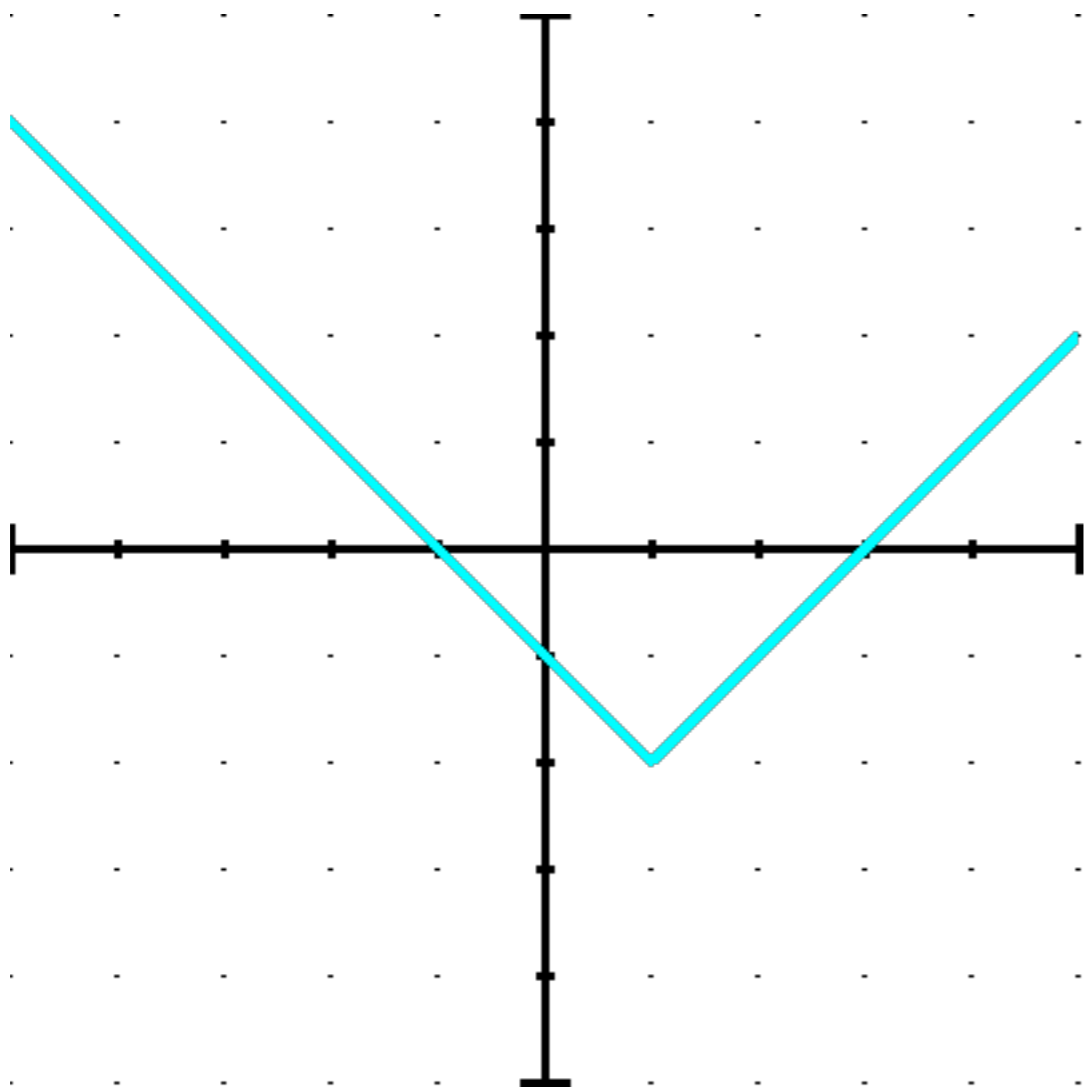
All together



$$y = a|x - h| + k$$

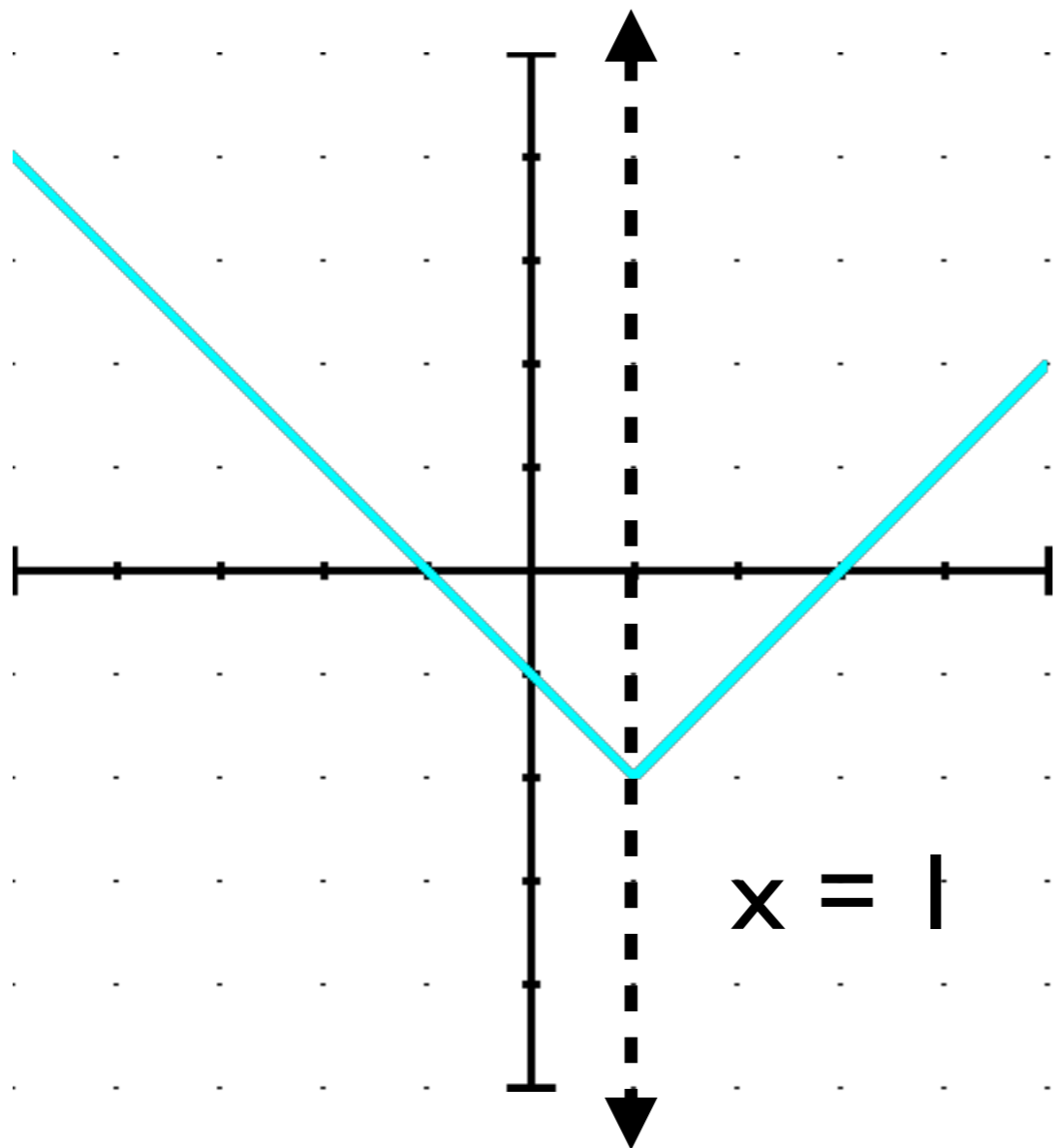
- a - the vertical stretch
- h - the x-coordinate of the vertex (horizontal shift)
- k - the y - coordinate of the vertex (vertical shift)

Line of Symmetry



$$y = |x - 1| - 2$$

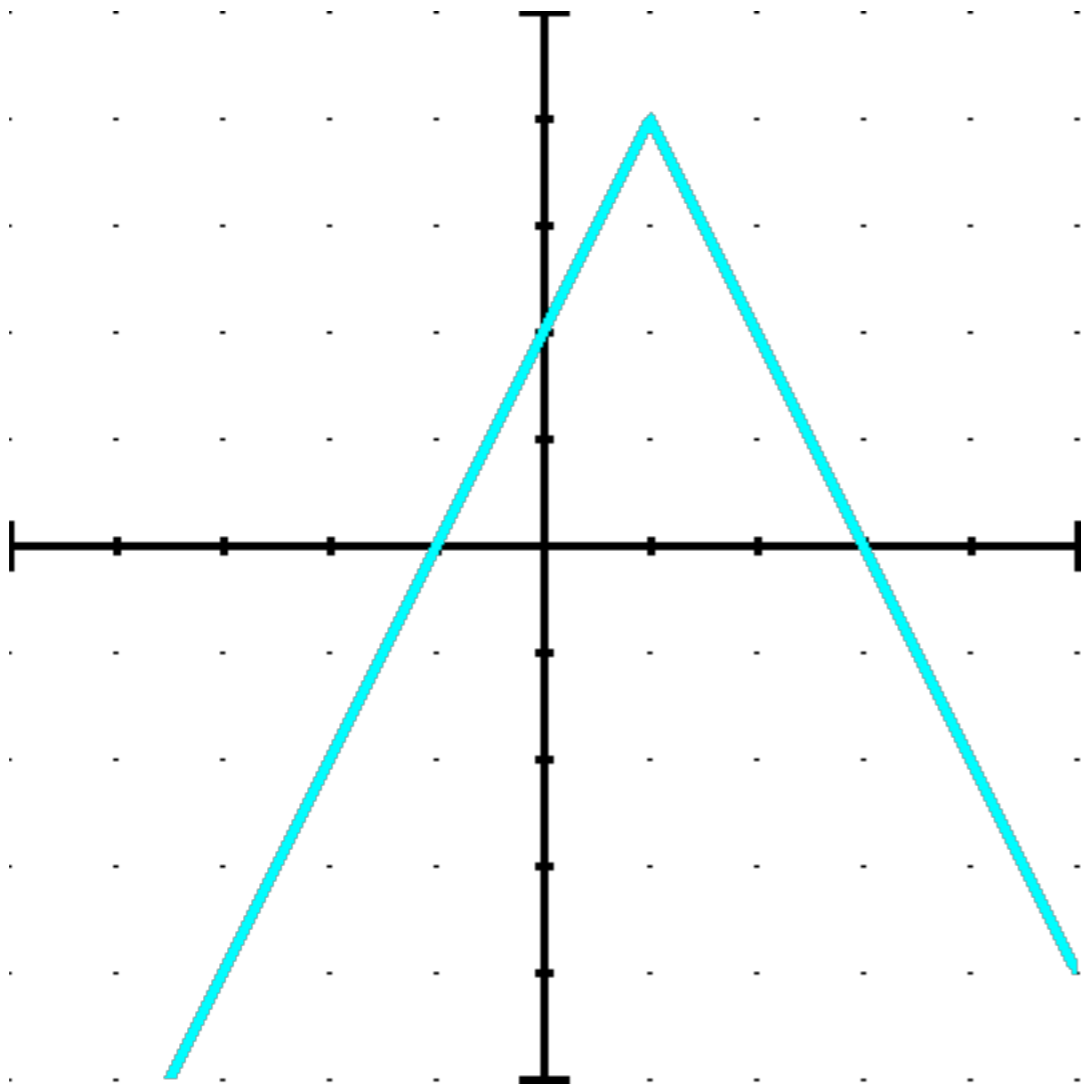
Line of Symmetry



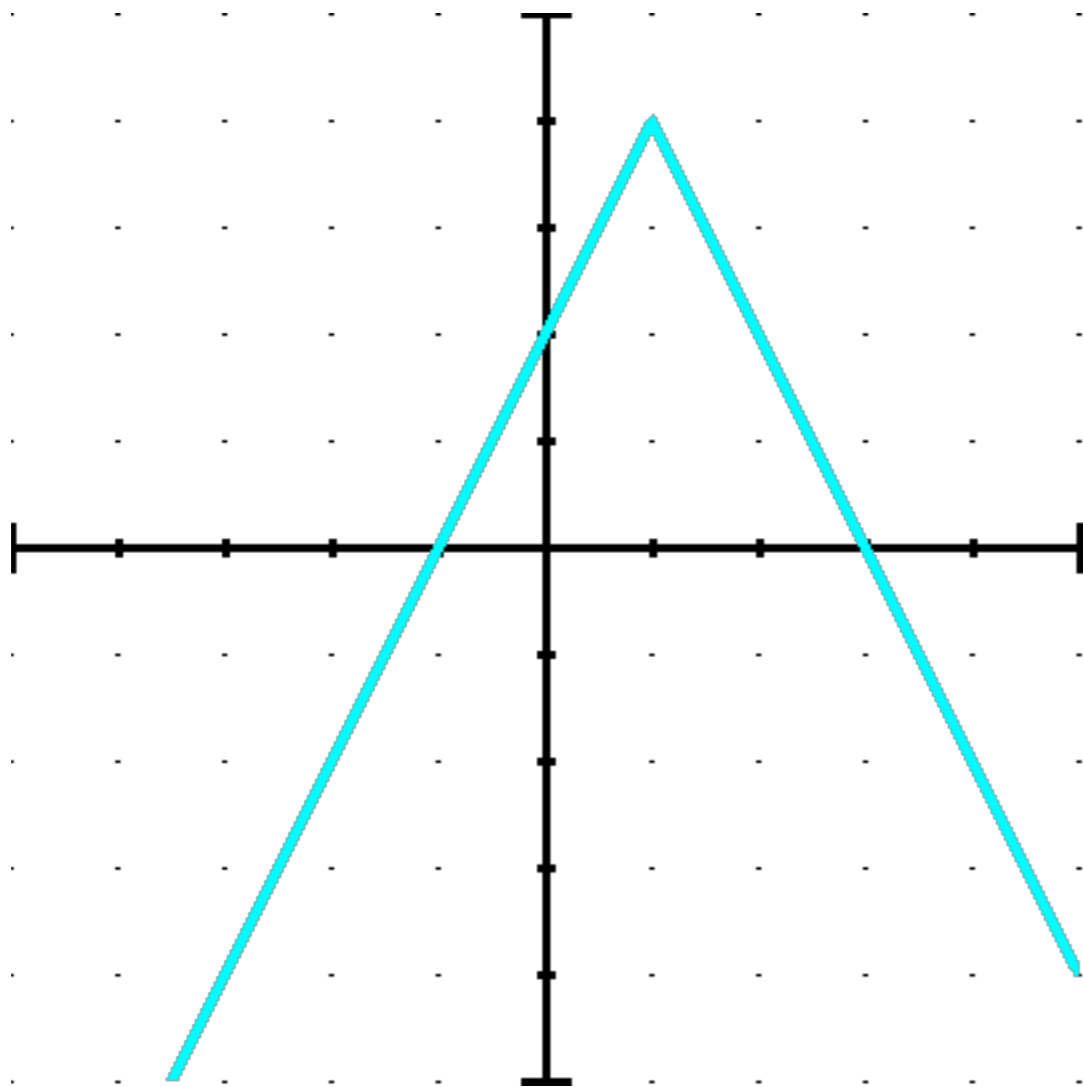
$$y = |x - 1| - 2$$

$$x = 1$$

Upside Down...?

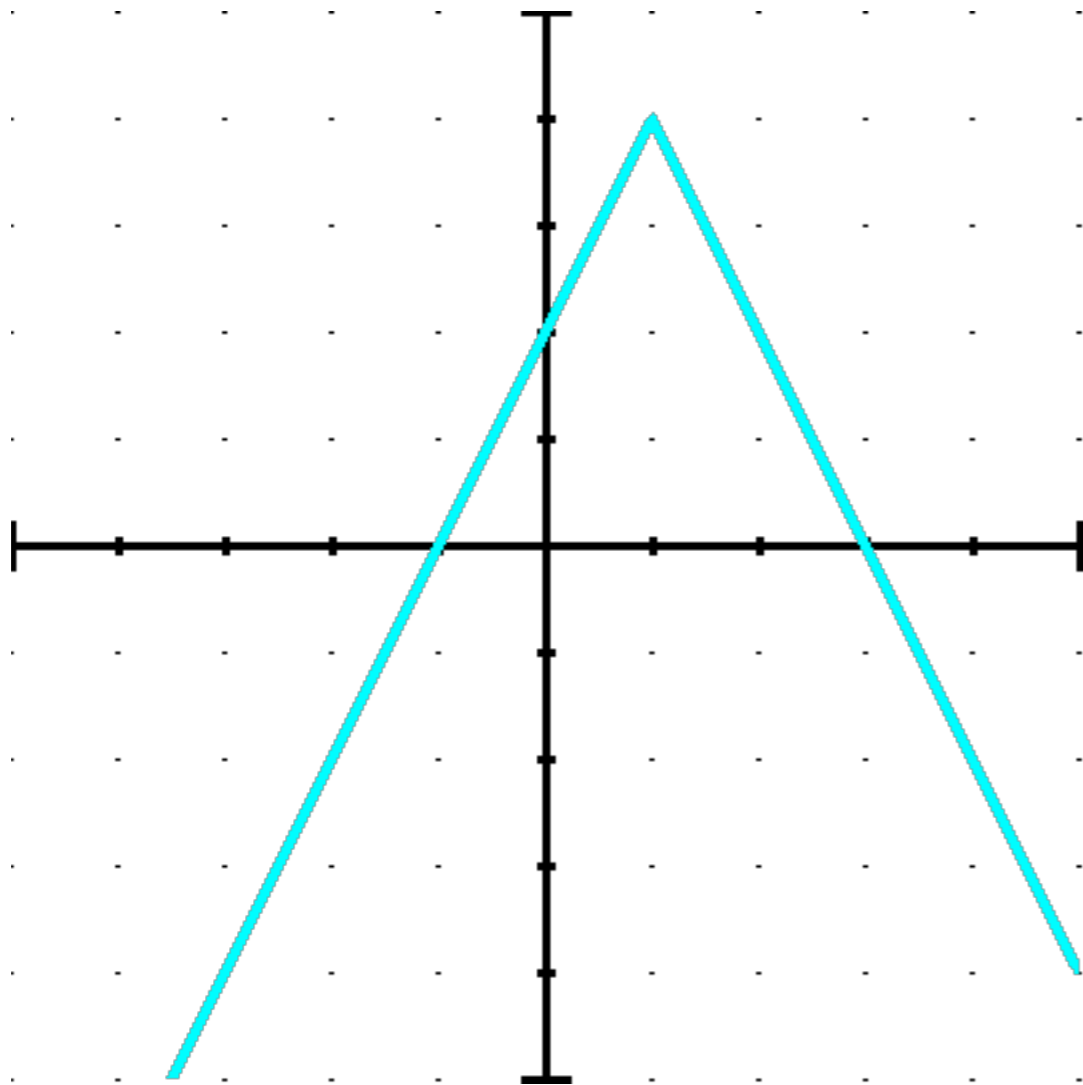


Upside Down...?



$$y = -2|x - 1| + 4$$

Upside Down...?



$$y = -2|x - 1| + 4$$

When $a < 0$, the absolute value graph will point downward