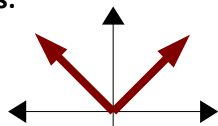


**Mathematics 3**  
**Graphing Absolute Value Functions**

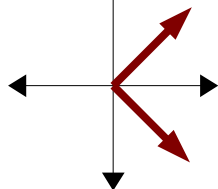
**Absolute Value Graphs:**

1.  $y = |x|$



This graph represents a function.

2.  $x = |y|$



This graph fails the vertical line test and is not a function.

The absolute value function has the x-variable inside the absolute value operators.

**Steps to graphing absolute value functions:**

1. Represent the absolute value equation similar to the point-slope form of the linear equation:

Case 1:  $y - b = |m(x - a)|$       or Case 2:  $y - b = -|m(x - a)|$

2. The point (a, b) represents the vertex of the absolute value function.
3. For Case 1, the function opens upwards, and for Case 2, the function opens downwards.
4. The constant m represents the slopes of the two rays that make up the absolute value function. For Case 1, **+m** represents the slope of the ray to the right of the vertex, while **-m** represents the slope of the ray to the left of the vertex. It is the reverse for Case 2.

**Examples:**

<p><math>y = \left  \frac{x}{4} \right </math></p>	<p><math>y + 3 -  3x + 9  = 0 \rightarrow y + 3 =  3(x + 3) </math></p> <p>(-3, -3)</p>
<p><math>y = \left  \frac{1}{2}x + 1 \right  \rightarrow y = \left  \frac{1}{2}(x + 2) \right </math></p> <p>(-2, 0)</p>	<p><math>-2 x + 1  - y + 2 = 0 \rightarrow y - 2 = - 2(x + 1) </math></p> <p>(-1, 2)</p>