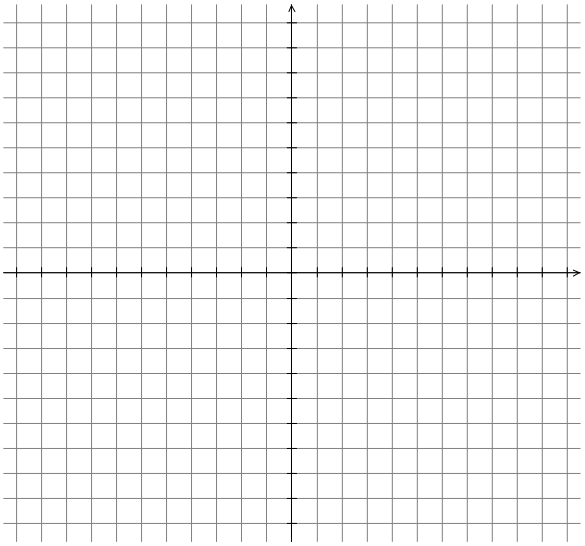
Linear Lab

Given the function $f(x)$ = _____

Fill in the table:

x	$f(x)$
-2	
0	
2	



Write these points as ordered pairs: (,), (,), (,)

Plot these points on the graph and join with a straight line.
Compute the slope of the line by using the formula

$$\text{slope } = m = \frac{y_2 - y_1}{x_2 - x_1} \text{ where}$$

(x_1, y_1) are the values from the first point and

(x_2, y_2) are the values from the second point.

The slope of the line shown is _____.

Find students in the class that have a line with the same slope as yours. This is your group. Compare your function and its graph with members in your group.

What do you observe? What is the same for each graph? What is different?

Write down a new function, $g(x) = mx + 1$, using the same slope that your group had for $f(x)$.
$g(x)$ = _____. Based on what you just learned, see if you can graph $g(x)$ without plugging in any values.

Go to the website http://www.mathsisfun.com/data/straight_line_graph.html .
Change the value of b by dragging the slider bar. Does the graph do what you'd expect based on what you have seen with the lines in your group?

Now use the slider to change m and observe what changing m does to the graph of the line.

As the value of the m becomes larger what can you say about the line?

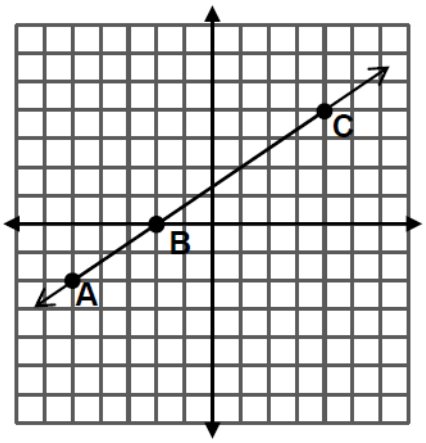
Drag the slider until you have a horizontal line. What is the value of the m? (this is the slope)

Drag the slider until if you were walking along the line from left to right you would be descending. What is the sign of m (the slope) when the line is descending?

Go to the website http://www.learningwave.com/lwonline/algebra_section2/slope5.html and have each member of your group compute the slope of a different climber and then determine the winner and enter that with the slope at the website to see if you are correct.

MORE IDEAS ABOUT SLOPE

$$SLOPE = \frac{rise}{run} = \frac{vertical\ change}{horizontal\ change}$$

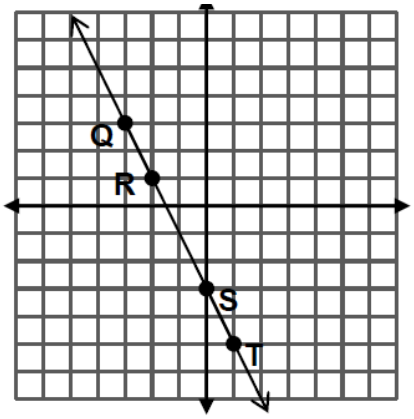


To get from A to B, you move ___ units **up** and ___ units to the **right**. $slope = \frac{\square}{\square}$

To get from B to C, you move ___ units **up** and ___ units to the **right**. $slope = \frac{\square}{\square}$

What relationship do you see between the two slopes?

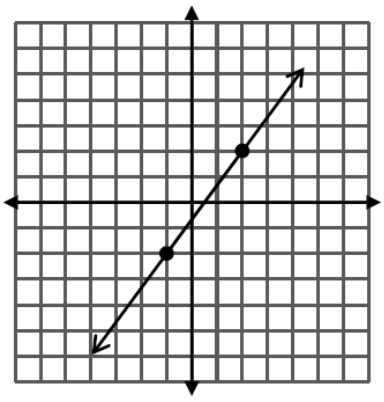
When you move **down**, since you are decreasing, you need a **negative sign** the number because you are subtracting from the *y* value where you started.



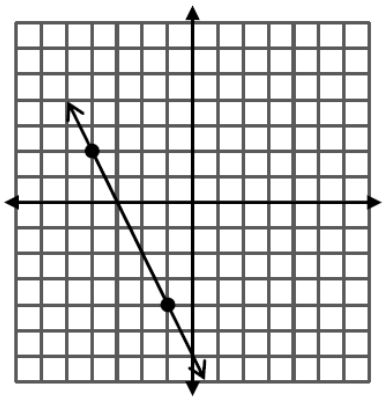
To get from R to S, you move ___ units **down** and ___ units to the **right**. $slope = \frac{\square}{\square}$

To get from Q to T, you move ___ units **down** and ___ units to the **right**. $slope = \frac{\square}{\square}$

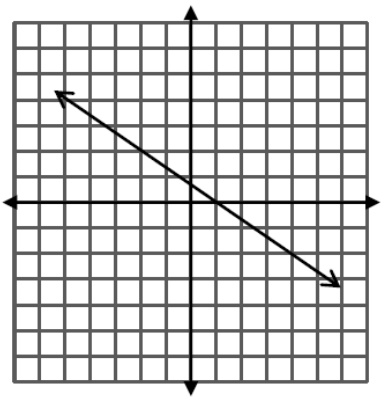
What relationship do you see between the two slopes?



Up/down: ___
Right: _____ *slope* =



Up/down: ___
Right: _____ *slope* =

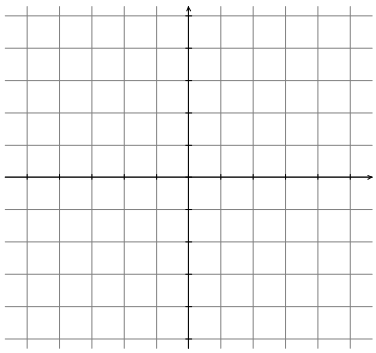


Up/down: ___
Right: _____ *slope* =

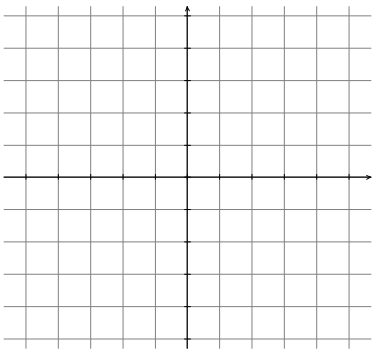
Watch the animation located at
http://rwdacad01.slcc.edu/academics/dept/math/shaider/1010TNG/graphfromslopeintform.html

Graph the following:

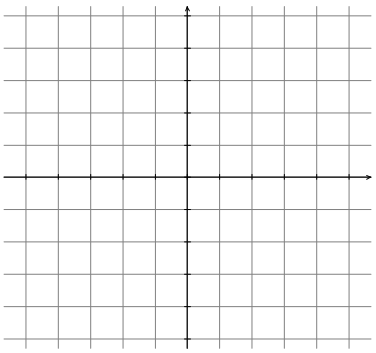
$y = \frac{1}{4}x - 3$



$y = 2x + 1$



$2x + 3y = 6$



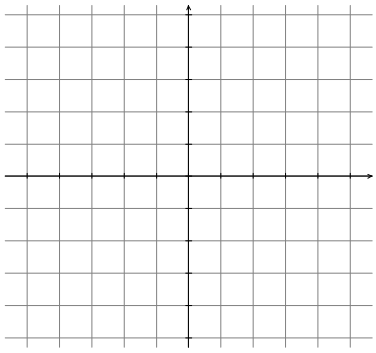
Remember what the slope of a horizontal line was? So to graph a horizontal line the equation would be $y = 0x + b$ or $y = b$.

The slope of a vertical line is undefined because any two points on a vertical line have the same value and computing slope $= m = \frac{y_2 - y_1}{x_2 - x_1}$ you would have 0 for the denominator.

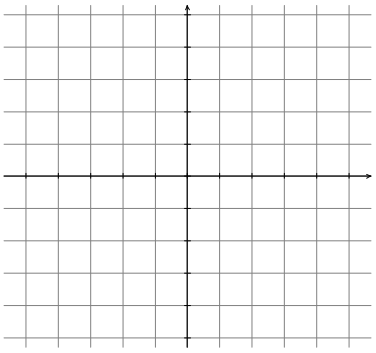
The equation of a vertical line is $x = a$ where a is the x value of any point on the line.

Now graph the following:

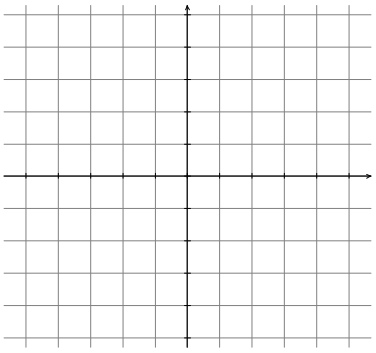
$y = 4$



$x = -3$



$y = 0$



Each member of your group should get on a computer and go to
http://funbasedlearning.com/algebra/graphing/lines/default.htm and click "Play Game".
The object is to pick the linear equation from the choices at the bottom so that the line drawn for that equation will go through the most gems. Lines that go through more gems get more points. See if you can beat your groupmates!