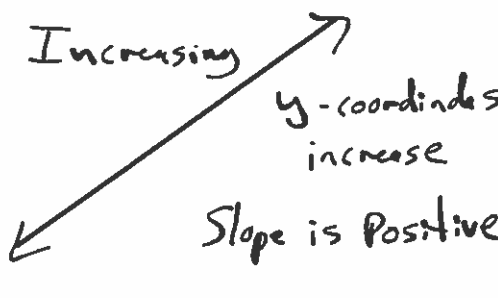
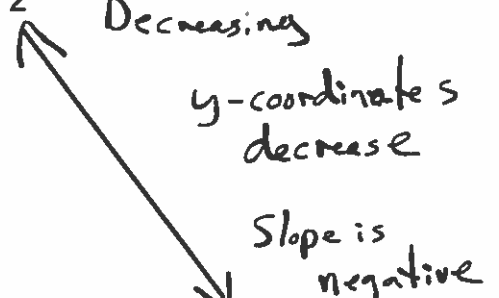
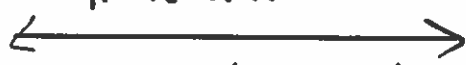



Types of Lines: Look at what the line does from left to right.

<p>1</p> <p>Increasing</p> <p>y-coordinates increase</p> <p>Slope is Positive</p> 	<p>2</p> <p>Decreasing</p> <p>y-coordinates decrease</p> <p>Slope is negative</p> 
<p>3</p> <p>Horizontal</p> <p>y-coordinates do not change</p> <p>Slope is zero.</p> <p>0</p> 	<p>4</p> <p>Vertical</p> <p>Line does not go from left to right!</p> <p>Slope is <u>undefined</u>.</p> 

The slope of a line (rate of change) is the ratio that describes what the line does from left to right.

We use the letter "m" for the slope of a line.

$$m = \frac{\text{change in y-values}}{\text{change in x-values}} = \frac{\Delta y}{\Delta x}$$

$$(x_1, y_1) \quad (x_2, y_2)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \odot \quad \star \left( \frac{\text{rise}}{\text{run}} \right)$$

Find the slope of the line containing the following points.  
Describe the line as increasing, decreasing, horizontal or vertical.

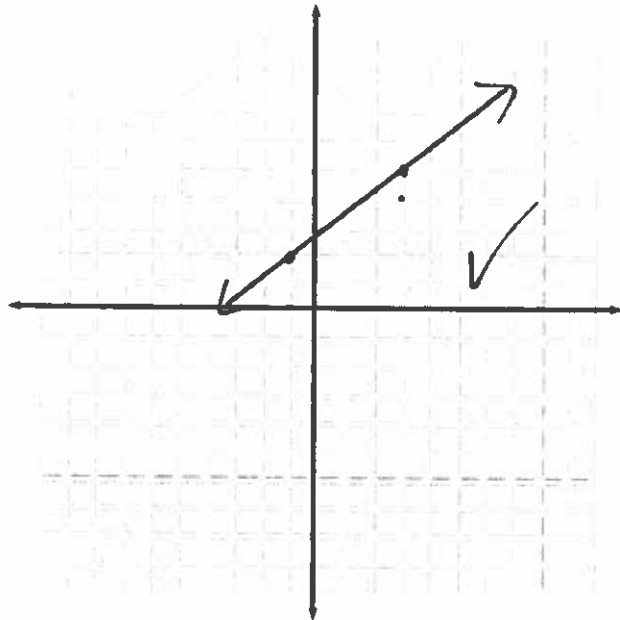
Ex 1:  $(-1, 2)$  and  $(3, 5)$

$$m = \frac{\Delta y}{\Delta x} = \frac{5-2}{3-(-1)}$$

$$m = \frac{3}{4}$$

Pos. slope

Inc. Line



Find the slope of the line containing the following points.  
Describe the line as increasing, decreasing, horizontal or vertical.

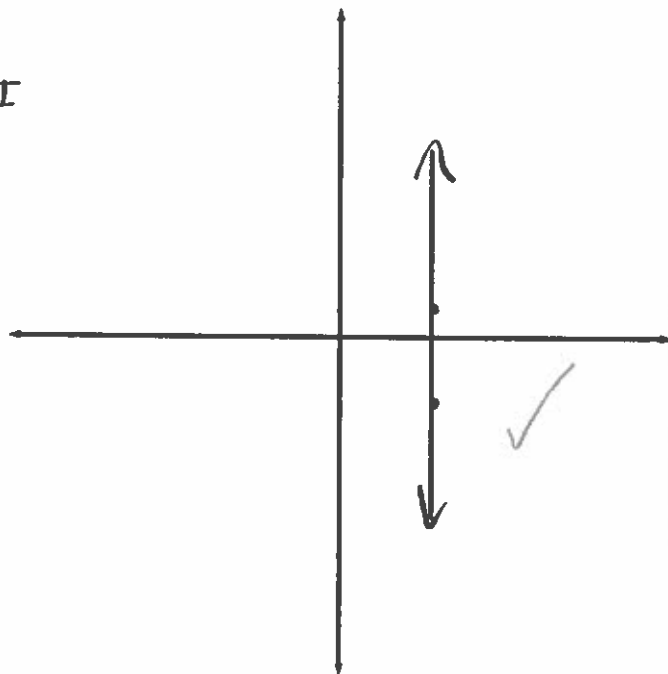
Ex 2:  $(3, 1)$  and  $(3, -2)$

$$m = \frac{\Delta y}{\Delta x} = \frac{-2-1}{3-3}$$

$$m = \frac{-3}{0}$$

$m$  is undefined

Vertical Line



Find the slope of the line containing the following points.  
Describe the line as increasing, decreasing, horizontal or vertical.

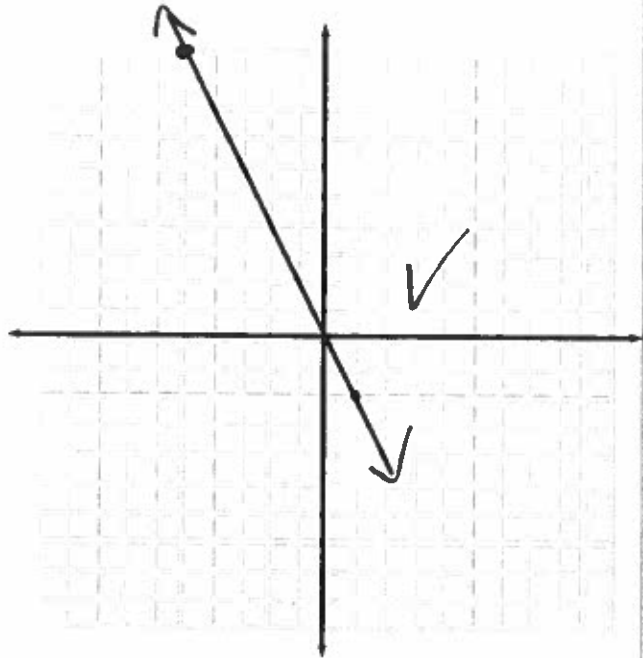
Ex 3:  $(1, -2)$  and  $(-5, 10)$   
 $\text{I}$   $\text{II}$

$$m = \frac{\Delta y}{\Delta x} = \frac{10 - (-2)}{-5 - 1}$$

$$m = \frac{12}{-6}$$

$$m = -2 \quad \text{Neg slope}$$

Decreasing Line



Find the slope of the line that passes through the given points.  
Describe the line as increasing, decreasing, horizontal or vertical.

Ex 4:  $(3, 5)$  and  $(6, -1)$

$$m = \frac{\Delta y}{\Delta x} = \frac{5 - (-1)}{3 - 6}$$

$$m = \frac{6}{-3}$$

$$m = -2 \quad \text{Dec. Line}$$

Ex 5:  $(-2, 4)$  and  $(4, 4)$

$$m = \frac{\Delta y}{\Delta x} = \frac{4 - 4}{-2 - 4}$$

$$m = \frac{0}{-6}$$

$$m = 0 \quad \text{Horizontal Line}$$

Ex 6:  $(2, 7)$  and  $(6, 21)$

$$m = \frac{\Delta y}{\Delta x} = \frac{7 - 21}{2 - 6}$$

$$m = \frac{-14}{-4}$$

$$m = \frac{7}{2} \quad \text{Inc. Line}$$

Ex 7:  $(-5, -8)$  and  $(-5, 0)$

$$m = \frac{\Delta y}{\Delta x} = \frac{-8 - 0}{-5 - (-5)}$$

$$m = \frac{-8}{0}$$

$$m \text{ is undefined} \quad \text{Vertical Line}$$