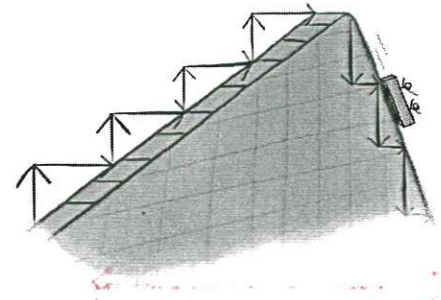
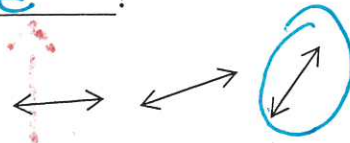


Slope!

The steepness of a line is called slope !

Circle the line with the biggest slope...



The letter we use for slope is a lowercase m ! Why?! Because it comes from the French word *monter* which means to climb or to rise. FUN FACT!

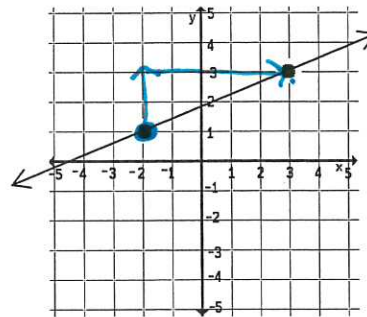
When given a graph of a line, we need to know a simple definition of slope:

$$m = \frac{\text{Rise}}{\text{Run}}$$

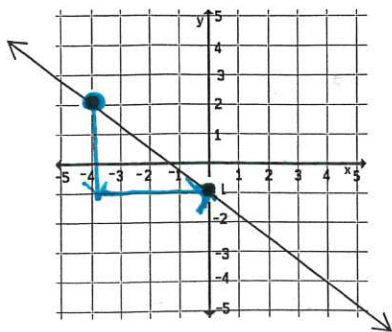
** Slope is the ratio of a line's vertical change to its horizontal change. That's what we mean by "rise over run"!

How to find the slope of a line when given a graph of a line:

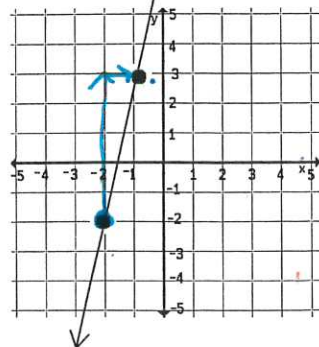
- 1) Start at the point farthest to the left !
- 2) Find the *rise*! Up: Positive
Down: Negative
- 3) Find the *run*! Right: Positive
Left: Negative



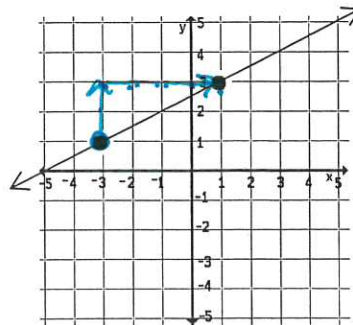
Find the slope of the following lines!



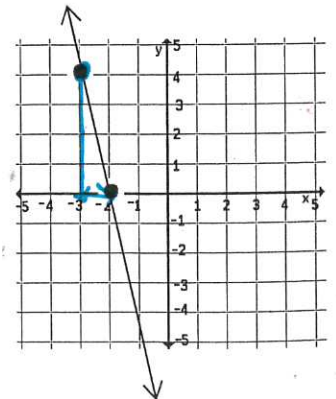
$$m = \frac{-3}{4}$$



$$m = \frac{5}{1} = 5$$



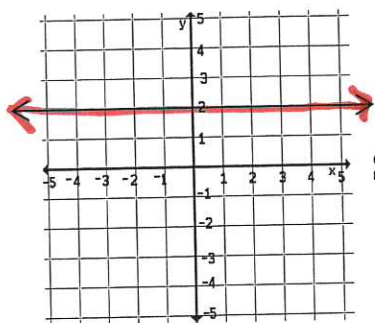
$$m = \frac{2}{4} = \frac{1}{2}$$



$$m = \frac{-4}{1} = -4$$

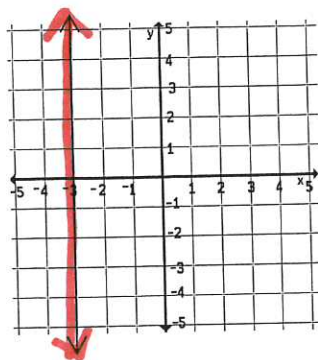
Horizontal and Vertical Lines...

Horizontal Line



Slope = 0

Vertical Line



Slope = undefined

$$\begin{aligned} -3 &= -1 \\ -3 &= +1 \end{aligned}$$

Sometimes we are not given a picture, but instead we are given 2 points on the line. When this is the case, we must implement another definition of slope:

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

In other words, slope is $\frac{\text{Change in } y}{\text{Change in } x}$

How to find the slope of a line when given two points on the line:

1) Subtract one y-value from another y-value!

★ (It helps to draw arrows!)

2) Subtract one x-value from another x-value!

(It helps to draw arrows!)

(-2, 3) and (1, 7)

x_1, y_1 x_2, y_2

$$m = \frac{7-3}{1-(-2)} = \frac{7-3}{1+2} = \frac{4}{3}$$

Find the slope of the line that passes through each pair of points:

(6, -1) & (4, 2)
 x_1, y_1 x_2, y_2

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

$$m = \frac{2 - (-1)}{4 - 6}$$

$$m = \frac{2+1}{4-6} = \frac{3}{-2}$$

(3, -2) & (4, 3)
 x_1, y_1 x_2, y_2

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

$$m = \frac{3 - (-2)}{4 - 3}$$

$$m = \frac{3+2}{4-3} = \frac{5}{1} = 5$$

(6, 5) & (3, 4)
 x_1, y_1 x_2, y_2

$$m = \frac{4-5}{3-6}$$

$$m = \frac{-1}{-3}$$

$$m = \frac{1}{3}$$

(-1, 7) & (-3, 1)
 x_1, y_1 x_2, y_2

$$m = \frac{1-7}{-3-(-1)}$$

$$m = \frac{1-7}{-3+1} = \frac{-6}{-2} = 3$$

$$= 3$$