FMP10 Name: _____
Date: _____

# Unit 5: Linear Equations & Graphs

## 5.0 Slope

**Slope:** The ratio of the vertical change (rise) to the horizontal change (run) of a line or a line segment.

Average rate of change.

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} \quad \text{or} \quad m = \frac{\text{rise}}{\text{run}} \quad \text{or} \quad m = \frac{\Delta y}{\Delta x}$$

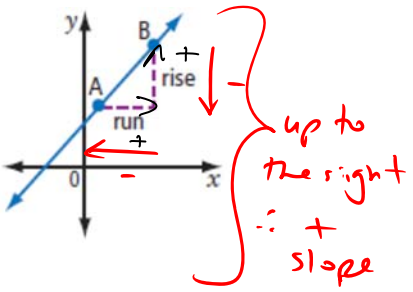
* $\Delta$ = delta "change in"

A positive change in both the vertical and horizontal values leads to a

positive slope.

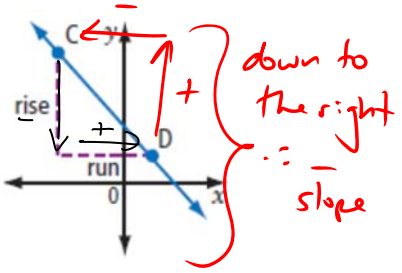
A negative change in both the vertical and horizontal values leads to a

positive slope.




A negative change in one and a positive change in the other leads to a

negative slope.




**Ex.** Classify the slope of each line segment as positive, negative or neither. Then, calculate each slope. m = slope

$m_{AB} = \frac{7}{5}$

$m_{CD} = \frac{10}{0}$

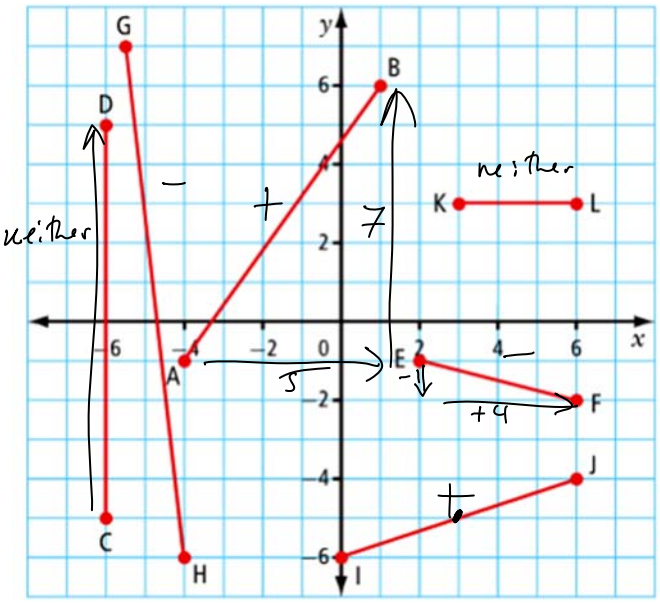
= undefined ← for all vertical lines

$m_{EF} = \frac{-1}{4}$

$m_{GH} = \frac{-13}{1.5} \times 2 = \frac{-26}{3}$

$m_{IJ} = \frac{2}{6} = \frac{1}{3}$

$m_{KL} = \frac{0}{3} = 0$



Slope formula: Given two points $(x_1, y_1)$ and $(x_2, y_2)$ the slope between them is

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$ * on data sheet

**Ex.** What is the slope, m, of each line segment with the given endpoints?

a) S(-3, 6) and T(5, 2)

$m = \frac{2-6}{5-(-3)}$ OR $\frac{6-2}{-3-5}$

$= \frac{-4}{8}$ $= \frac{4}{-8}$

$= -\frac{1}{2}$ $= -\frac{1}{2}$

b) H(4, 3) and K(4, 8)

$m = \frac{3-8}{4-4}$

$= \frac{-5}{0}$

m = undefined

c) M(-9, -7) and N(-1, -7)

$m = \frac{-7-(-7)}{-1-(-9)}$ horizontal line

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

**Ex.** The point (-3,2) is on a line that has a slope of $\frac{-3}{4}$. List three other points on the line.

(-3, 2)

+4 -3

(1, -1)

+4 -3

(5, -4)

OR

$\frac{-3}{4} \leftarrow$ rise $\rightarrow \frac{3}{-4}$

(-3, 2)

-4 +3

(-7, 5)

**Ex.** The point (-6,1) is on a line that has a slope of $\frac{1}{3}$. List three other points on the line.

(-9, 0) $= \frac{-1}{-3}$

-3 -1

(-6, 1)

**Ex.** Graph the line with given point and slope:

a) $(-3, 2), m = -\frac{1}{3}$

$\frac{-1}{3}$ or $\frac{1}{-3}$

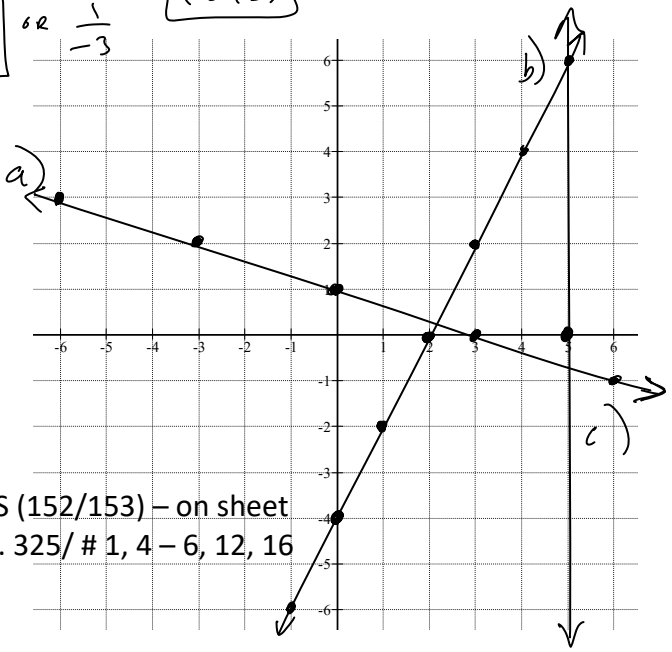
b) $(0, -4), m = 2$

(-3, 2)

+3

(0, 3)

c) $(5, 0), m = undefined$




* at least 3 points

Practice: WS (152/153) – on sheet

pg. 325/ # 1, 4 – 6, 12, 16