KEY

AA – Section 5.1 Notes – Rate of Change and Slope

Objective:
To find the rate of change (slope) from tables, graphs, or ordered pairs

Vocabulary:

Slope **is the rate of change of a line.**

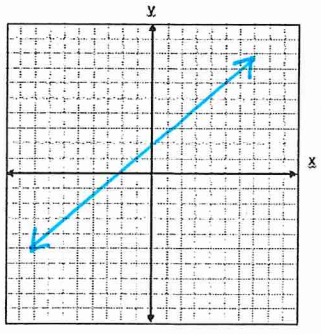
Slope can be positive (increasing), negative (decreasing), zero or undefined. *Slope* is written as a fraction, whether proper or improper. Usually, you do not write *slope* as a decimal or a mixed number.

label your points (x_1, y_1) (x_2, y_2)

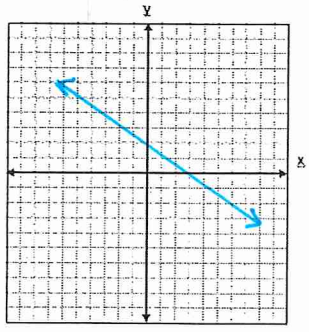
Slope (m) $= \frac{vertical\ change}{horizontal\ change} \updownarrow \leftrightarrow = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$, where $x_2 - x_1 \neq 0$

Rate of Change $= \frac{change\ in\ the\ dependent\ variable\ (y)}{change\ in\ the\ independent\ variable\ (x)}$

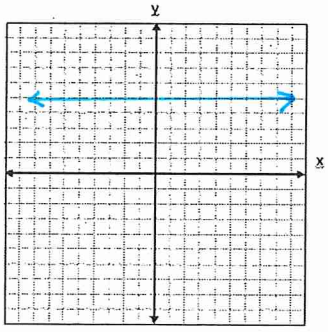
Slopes of Lines



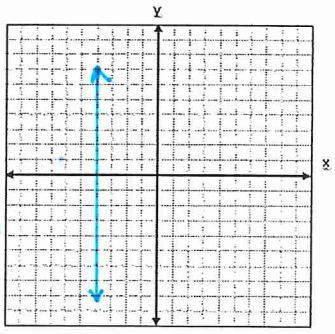
A line that slants upward from left to right has a Positive slope



A line that slants downward from left to right has a Negative slope.



A horizontal line has a slope of Zero



A vertical line has a slope that is Undefined

$\frac{O}{K}$ "OK"

$\frac{N}{O}$ "NO"

"HOYVUX"
H – Horizontal Line
O – Zero Slope
Y – Equation written as y = ___
V – Vertical Line
U – Undefined Slope
X – Equation written as x = ___

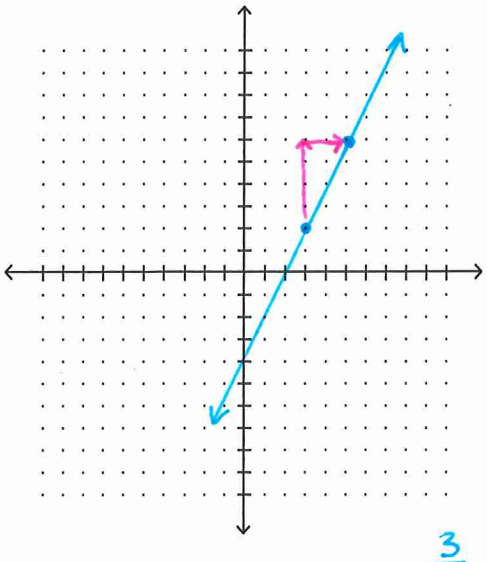
$m = \frac{y_2 - y_1}{x_2 - x_1}$

Examples – 5.1

Finding Slope Using a Graph –

Plot the points, then count rise over run.

1. (3, 2) (5, 6) m = $\frac{4}{2} = 2$



Find the Slope Using the Formula.

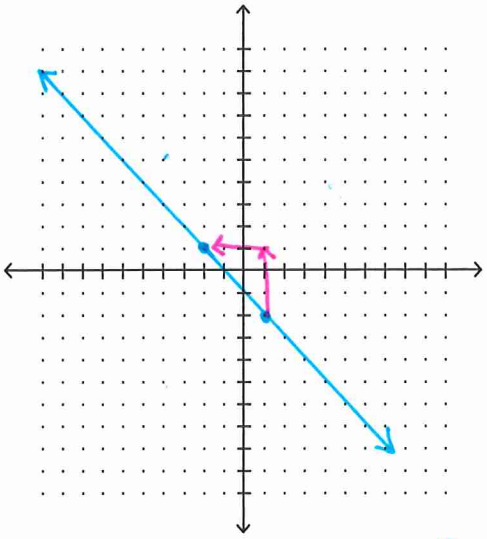
(3,2) (5,6)
x_1, y_1 x_2, y_2

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-2}{5-3} = \frac{4}{2} = 2$

Same (:

$m = 2$

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



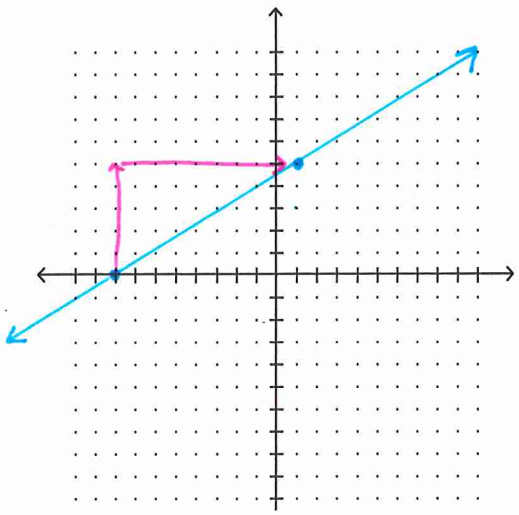
(-2,1) (1,-2)
x_1, y_1 x_2, y_2

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2-1}{1--2} = \frac{-3}{3} = -1$

Same (:

$m = -1$

3. (– 8, 0) (1, 5) m = $\frac{5}{9}$



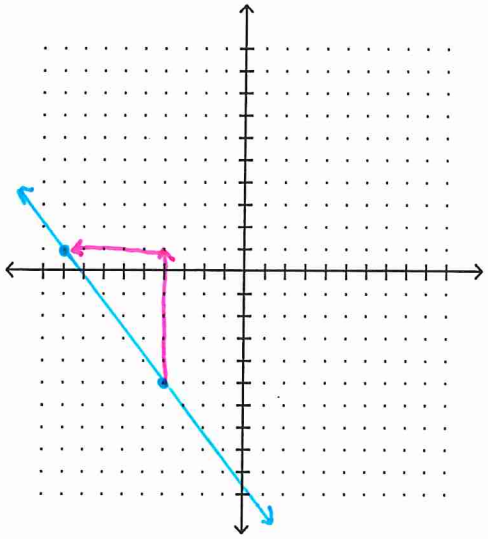
(-8,0) (1,5)
x_1, y_1 x_2, y_2

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-0}{1--8} = \frac{5}{9}$

Same (:

$m = \frac{5}{9}$

4. $(-4, -5)\ (-9, 1)$ m = $\frac{6}{-5}$



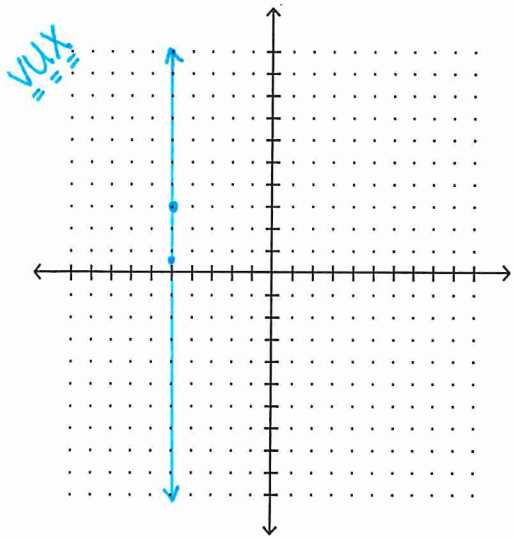
$(-4,-5)$ $(-9,1)$
$x_1\ y_1$ $x_2\ y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1--5}{-9--4} = \frac{6}{-5}$

Same :)

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

5. $(-5, \frac{1}{2})\ (-5, 3)$ m = undefined



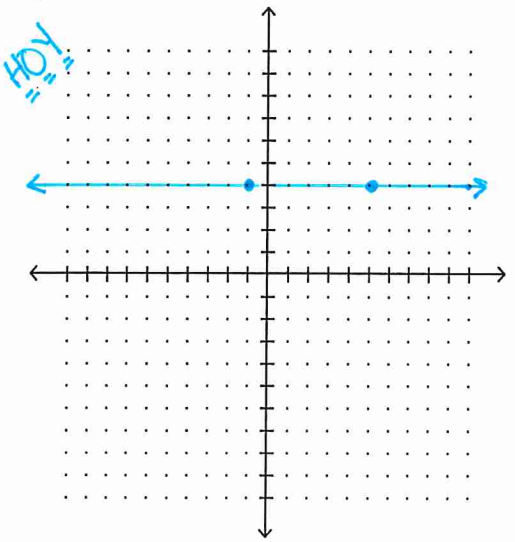
$(-5, \frac{1}{2})$ $(-5, 3)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - \frac{1}{2}}{-5--5} = \frac{2.5}{0}$ "$\frac{N}{0}$"

Same :)

m = undefined

6. $(-1, 4)\ (5, 4)$ m = 0



$(-1,4)$ $(5,4)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4-4}{5--1} = \frac{0}{6} = 0$ "$\frac{0}{K}$"

Same :)

m = 0