

Slope

- ❖ The **slope (m)** of a line is the **ratio** of the change in y-values (rise) to the change in x-values (run).
- ❖ The **slope** of the line is also called the **average rate of change**

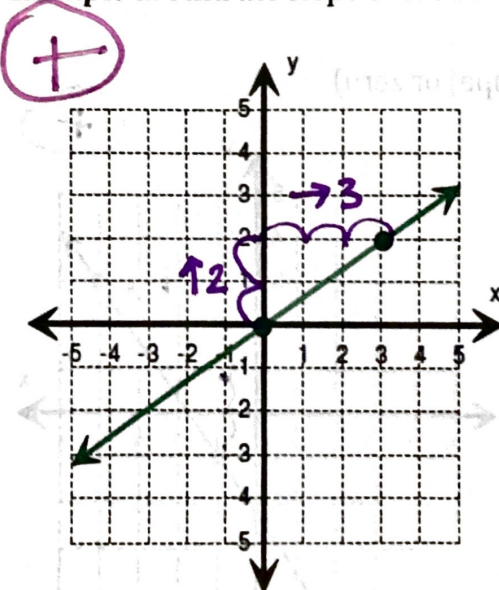
$$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{Change in output values}}{\text{Change in input values}}$$



- **POSITIVE SLOPES**
Lines that have a positive slope go **up** and to the **right**.
- **NEGATIVE SLOPES**
Lines that have a negative slope go **down** and to the **right**.
- **HORIZONTAL LINES**
All horizontal lines have a **zero** slope. (Change in y is zero)
- **VERTICAL LINES**
All vertical lines have an **undefined slope or no slope**.
(Change in x is zero: zero is in denominator)

Positive Slope	Negative Slope
Increasing	Decreasing
Zero Slope	Undefined Slope
Horizontal Line	Vertical Line

Example 1: Find the slope of each of the following lines.

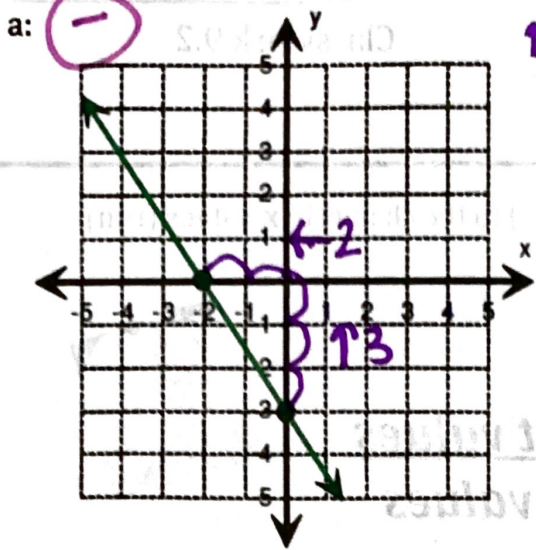


$$\frac{\text{rise}}{\text{run}} = \frac{\uparrow 2}{\rightarrow 3} = \frac{2}{3}$$

How To:
Determine how many units you go up/down from one point to the next and then over to the right.

- ★ Right / Up positive
- ★ Down / left negative

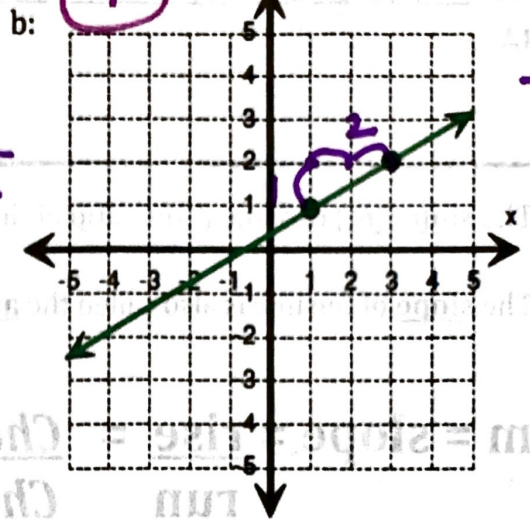
Example 2: Find the slope of each of the following lines.



$\uparrow 3 \leftarrow 2$

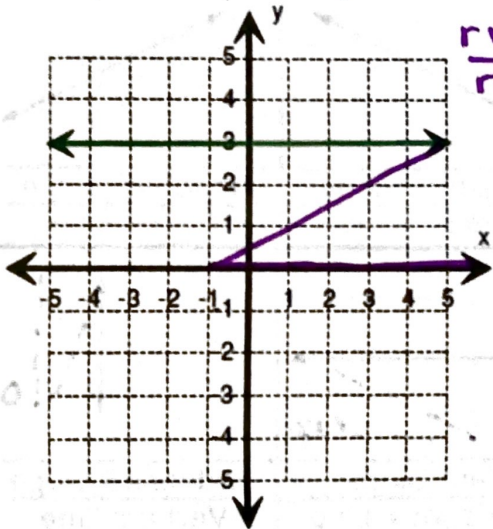
$$\frac{3}{-2} = \frac{-3}{2} = -\frac{3}{2}$$

all the same



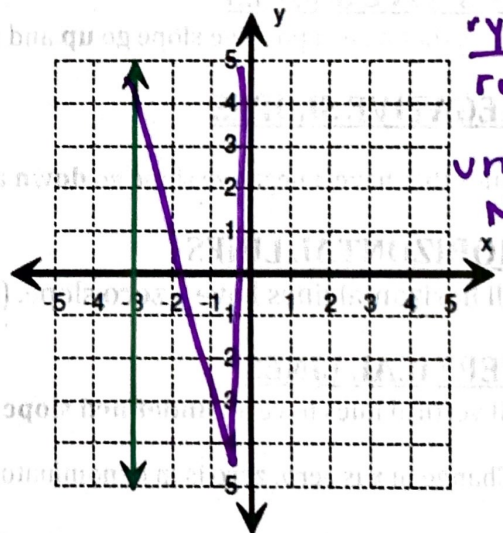
$\frac{1}{2}$

Example 3: Find the slope of the line.



$$\frac{\text{rise}}{\text{run}} = \frac{0}{1} = 0$$

Example 4: Find the slope of the line.



$$\frac{\text{rise}}{\text{run}} = \frac{1}{0}$$

undefined
no slope

Example 5:

a: Identify the type of slope (positive, negative, undefined (no slope) or zero)

positive

b: What is the slope of the line?

$\uparrow 4 \rightarrow 3$

$\frac{4}{3}$

c: Is the line a function?

Yes

