Notes: Determining the Slope of a Line

The slope of a line is a number that describes a line's steepness and direction. Slope is the ratio between the vertical change and the horizontal change in the line.

Read from L→R

Positive	Negative
⊕ uphill	N ⊖ downhill
The slope is positive if the line is increasing.	The slope is negative if the line is decreasing.
Zero	**Undefined**
The slope is zero if the line is horizontal.	The slope is undefined if the line is vertical.

To find the slope (m) you need any two points on the line:

1. Count the vertical change between the y-coordinates. (rise) ↕ $m = \frac{y}{x}$
2. Count the horizontal change between the x-coordinates. (run) ↔
3. Put the vertical change over the horizontal change then simplify the fraction, do not turn it into a mixed number or a decimal.
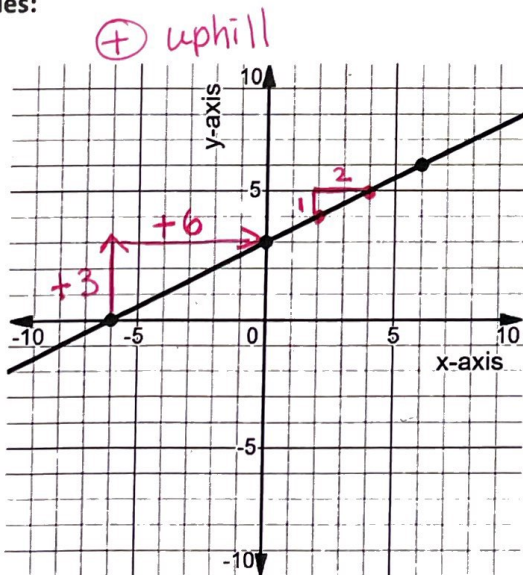
Improper

$$m = \text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$
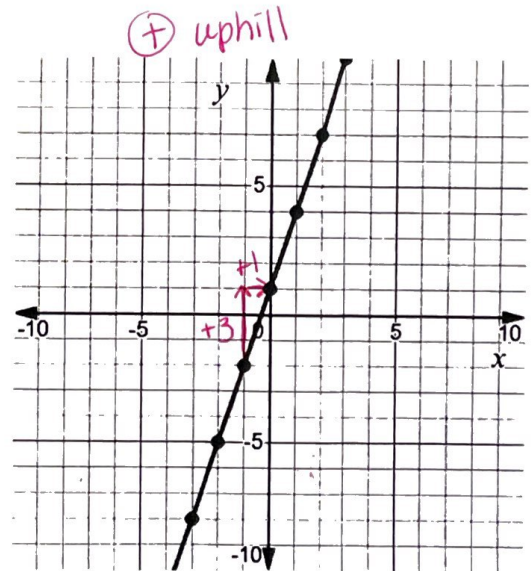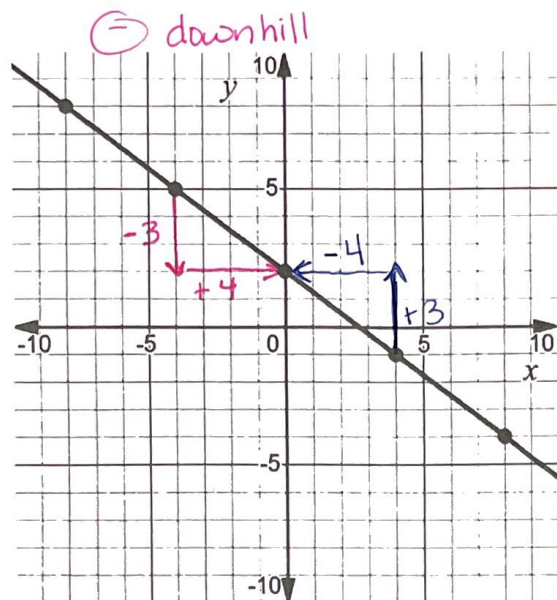
Examples:

#1. ⊕ uphill

#2. ⊕ uphill

$$m = \frac{\Delta y}{\Delta x} = \frac{up\ 3}{right\ 6} = \frac{3}{6} = \frac{1}{2}$$

$$m = \frac{up\ 3}{right\ 1} = \frac{3}{1} = 3$$
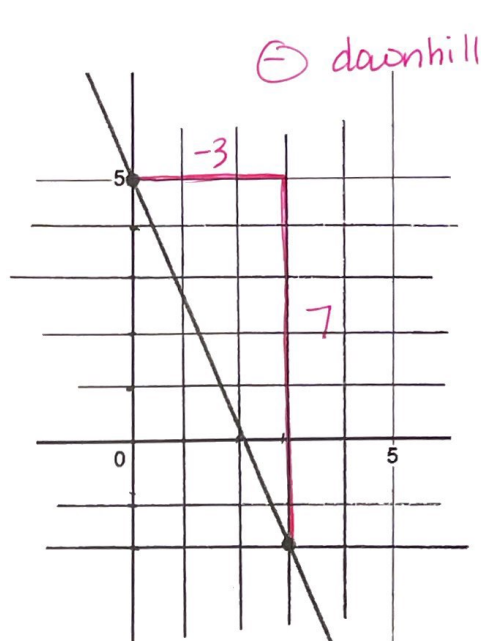
#3 ⊖ downhill

$m = \dfrac{\text{down } 3}{\text{Right } 4} = \dfrac{-3}{4}$
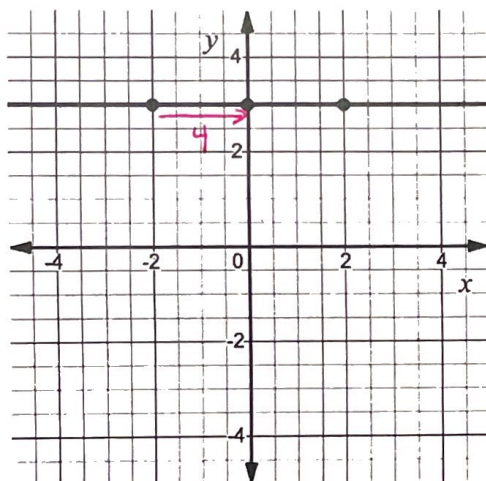
$m = \dfrac{\text{up } 3}{\text{left } 4} = \dfrac{3}{-4}$
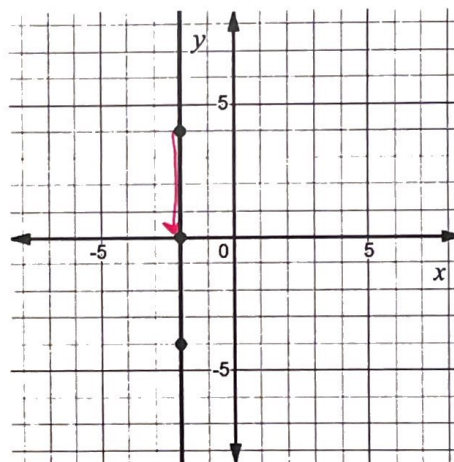
#4 ⊖ downhill

$m = \dfrac{7}{-3}$

SPECIAL CASES! *(horizontal line)*

#5.

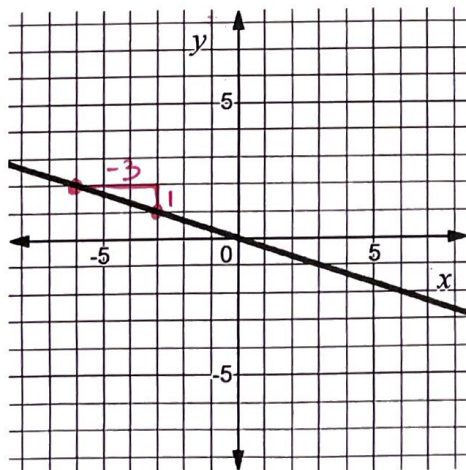$m = \dfrac{\Delta y}{\Delta x} = \dfrac{0}{4} = 0$

(vertical line)

#6

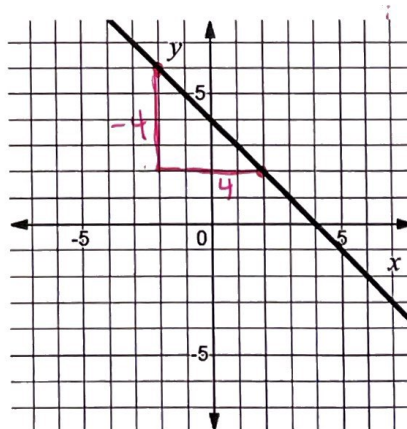$m = \dfrac{\Delta y}{\Delta x} = \dfrac{-4}{0} = \text{undefined}$

Sometimes there are no points drawn on a line. You need to look closely at where the line crosses the grid lines of the graph **exactly** to determine which points the line passes through.

#7

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

#8

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