

Rate of Change and Slope Guided Notes

Rate of Change

The rate of change represents a relationship between changing quantities.

$$\text{Rate of Change} = \frac{\text{Change in dependent variable}}{\text{Change in independent variable}}$$

The rate of change can both be **positive** or **negative**, depending on the change in the dependent variable with respect to the independent variable.

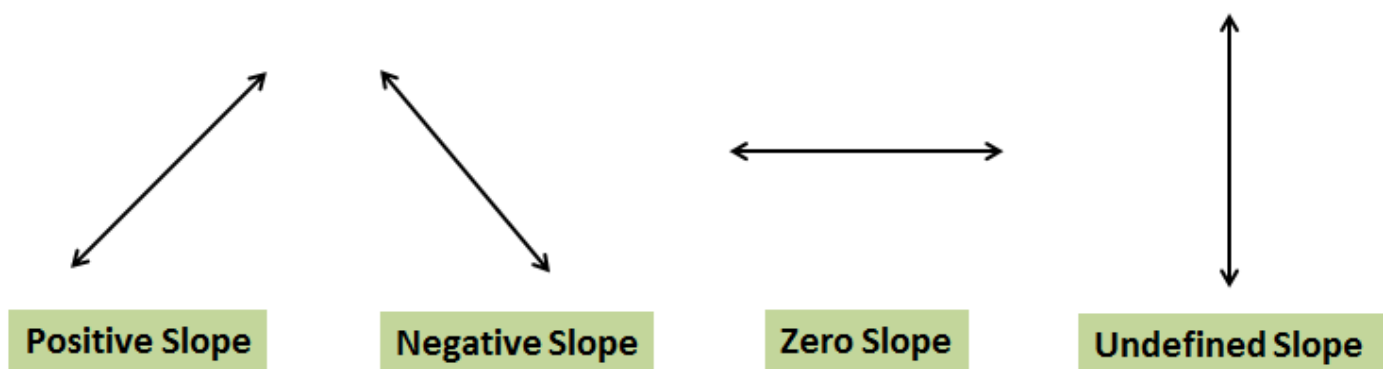
Slope

The rate of vertical change to the horizontal change between two points on a line is called the slope of a line.

$$\text{Slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

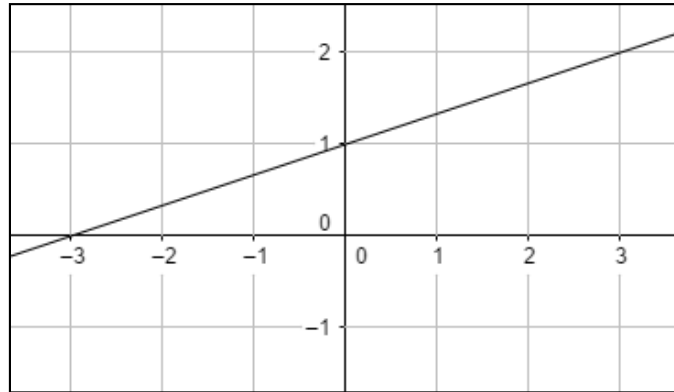
Depending on the vertical or horizontal change, the slope can be **positive, negative, zero or undefined**.

Models of Slope

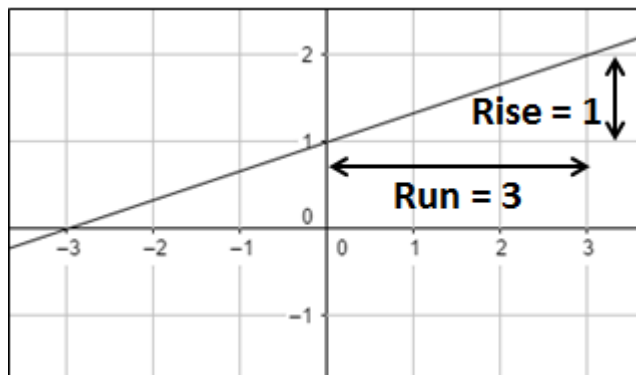


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Problem 1: What is the slope of the line shown in the graph? Is the slope positive or negative?



Solution



$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{1}{3}$$

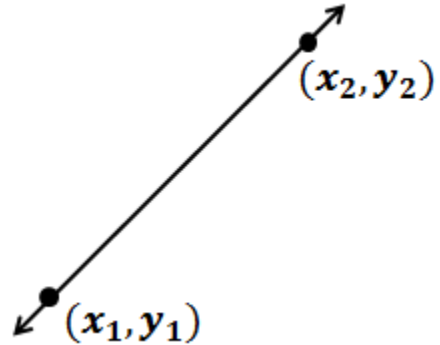
The slope is positive. The line is slanting upwards from left to right.

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Slope formula

Let (x_1, y_1) and (x_2, y_2) be two points on a line. Then the slope of the line is given by:

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



Problem 2: What is the slope of the line passing through $(2, 5)$ and $(-1, 8)$?

$$y_2 = 8, y_1 = 5, x_2 = -1, x_1 = 2$$

$$\text{Slope } m = \frac{8 - 5}{-1 - 2}$$

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