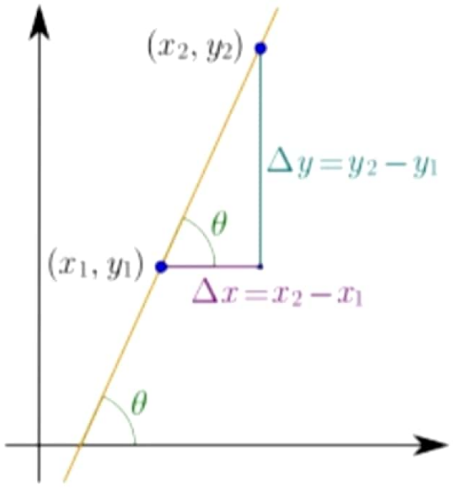
Chapter One

1- slope

The slope of a line is defined as the change in (y) coordinate with respect to the change in x coordinate of that line. The net change in y coordinate is Δy, while the net change in the x coordinate is (Δx). So the change in (y)



coordinate with respect to the change in (x) coordinate can be written as,

$m = \Delta y/\Delta x$
where, (m) is the slope

1-2-Slope between Two Points

We can find the slope of the line using different methods. The first method to find the value of the slope is by using the equation is given as,

$m = (y_2 - y_1) / (x_2 - x_1)$

Note that

$\tan \theta = \Delta y/\Delta x$

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The slope of a line can be calculated using two points lying on the straight line. Given the coordinates of the two points, we can apply the slope of line formula. Let coordinates of those two points be,

$P_1 = (x_1, y_1)$

$P_2 = (x_2, y_2)$

As we discussed in the previous sections, the slope is the "change in y coordinate with respect to the change in x coordinate of that line". So, putting the values of Δy and Δx in the equation of slope, we know that

:

$\Delta y = y_2 - y_1$
$\Delta x = x_2 - x_1$

Hence, using these values in a ratio, we get :

$\text{Slope} = m = \tan\theta = (y_2 - y_1)/(x_2 - x_1)$

Where, (m) is the slope, and (θ) is the angle made by the line with the positive x-axis.

Example1-:

If $p_1(1,2)$ and $p_2(-3,4)$ find the slope of the line.

Answer:

$m = \Delta y/\Delta x = (y_2 - y_1) / (x_2 - x_1)$

$m = 4\text{-}2 /\text{-}3 \text{-}1 = -1/2$

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Example 2- :

If the three points (1, 5), (2, 9), and (3, k) are collinear, find k.

Solution:

Let A = (1, 5) =(x_1, y_1)
B = (2, 9) = (x_2, y_2)
C = (3, k) = (x_3, y_3)

Since A, B, and C are collinear,

the slope of AB = slope of BC

By finding the slope from two points,

(9 - 5) / (2 - 1) = (k - 9) / (3 - 2)
4/1 = (k -9) /1
k - 9 = 4

k = 13

Answer: k = 13.

Example 3-:

Determine the value of c, if the slope of a line passing through the points (c, 7) and (8, -5) is 6.

Solution:

To find: the value of c

Given, Slope = m = 6, Points: (x_1, y_1) = (c, 7) and (x_2, y_2) = (8, -5)
We know that Slope

(m) = $(y_2 - y_1) / (x_2 - x_1)$
6 = (-5-7)/(8-c)
6 = (-12)/(8-c)
-2= (8-c)
-2-8 = -c,
c = 10