Assignment 1

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Problem 3b, ICSE 10 2019:

M and N are two points on the X axis and Y axis respectively. P (3, 2) divides the line segment MN in the ratio 2 : 3.
Find:
(i) the coordinates of M and N
(ii) slope of the line MN.

Solution:

Since M and N are points on x and y axis respectively
So,let M=(x,0) and N=(0,y)

from ratio formula for line segment we know that

$$x = \frac{x_1 b + x_2 a}{a + b} \tag{1}$$

$$y = \frac{y_1 b + y_2 a}{a + b} \tag{2}$$

where a:b is ratio in which (x,y) divides the line joining $(x_1, y_1) and (x_2, y_2)$

Now since P(3,2) divides M and N in ratio 2:3
So,by applying ratio formula to P on line MN, we get

$$3 = \frac{x * 3 + 0 * 2}{3 + 2}$$
$$\rightarrow 3 = \frac{3x}{5}$$
$$\rightarrow x = 5 \tag{3}$$
$$2 = \frac{0 * 3 + y * 2}{3 + 2}$$
$$\rightarrow 2 = \frac{2y}{5}$$
$$\rightarrow y = 5 \tag{4}$$

So,the points M and N would be **(5,0)** and **(0,5)** respectively.

Now,we know that the slope of any line AB is

$$slope = \frac{y_A - y_B}{x_A - x_B} \tag{5}$$

So,slope of line MN is

$$slope = \frac{0 - 5}{5 - 0}$$
$$\rightarrow slope = \textbf{-1} \tag{6}$$