AI1110 ASSIGNMENT 1

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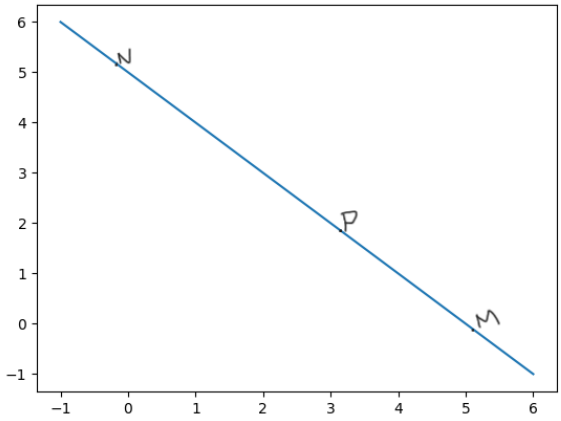
Q3 (b): M and N are two points on the X axis and Y axis respectively. $\mathbf{P}(3,2)$ divides the line segment MN in the ratio 2:3.
Find:
(i)the coordinates of M and N
(ii)the slope of MN.



Solution:
Given,
M and N are two points on X and Y axes respectively.
Let

$$\mathbf{M} = \begin{pmatrix} a \\ 0 \end{pmatrix} \tag{0.0.1}$$

$$\mathbf{N} = \begin{pmatrix} 0 \\ b \end{pmatrix} \tag{0.0.2}$$

P divides MN in the ratio 2:3.
According to Section formula,

$$\mathbf{P} = \begin{pmatrix} \frac{2(0)+3(a)}{2+3} \\ \frac{2(b)+3(0)}{2+3} \end{pmatrix} \tag{0.0.3}$$

$$\mathbf{P} = \begin{pmatrix} \frac{3a}{5} \\ \frac{2b}{5} \end{pmatrix} \tag{0.0.4}$$

But we have,
$\mathbf{P} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$
Therefore,

$$\begin{pmatrix} \frac{3a}{5} \\ \frac{2b}{5} \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$\implies$ a = 5 and b = 5

(i)$\mathbf{M} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}$ and $\mathbf{N} = \begin{pmatrix} 0 \\ 5 \end{pmatrix}$

(ii) Slope of MN = $\frac{5-0}{0-5}$

= -1