1-1.5-21

EE24BTECH11062 - Homa Harshitha Vuddanti

Question:
Find the ratio in which $\mathbf{P}(4, m)$ divides the line segment joining the points $\mathbf{A}(2, 3)$ and $\mathbf{B}(6, -3)$. Hence find m.
Solution:
Given,

$$A = \begin{pmatrix} 2 \\ 3 \end{pmatrix} \tag{0.1}$$

$$B = \begin{pmatrix} 6 \\ -3 \end{pmatrix} \tag{0.2}$$

$$P = \begin{pmatrix} 4 \\ m \end{pmatrix} \tag{0.3}$$

Section formula:
If C divides AB in the ratio k:1;

$$C = \frac{kB + A}{k + 1} \tag{0.4}$$

$$\implies \begin{pmatrix} 4 \\ m \end{pmatrix} = \frac{k\begin{pmatrix} 6 \\ -3 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix}}{k + 1} \tag{0.5}$$

$$\implies \begin{pmatrix} 4 \\ m \end{pmatrix} = \frac{1}{k + 1}\begin{pmatrix} 6k + 2 \\ -3k + 3 \end{pmatrix} \tag{0.6}$$

$$6k + 2 = 4(k + 1) \tag{0.7}$$

$$-3k + 3 = m(k + 1) \tag{0.8}$$

From equations (**??**) and (**??**),

$$k = 1, \tag{0.9}$$

$$m = 0 \tag{0.10}$$

Hence, *ratio* = 1 : 1;
$m = 0$.

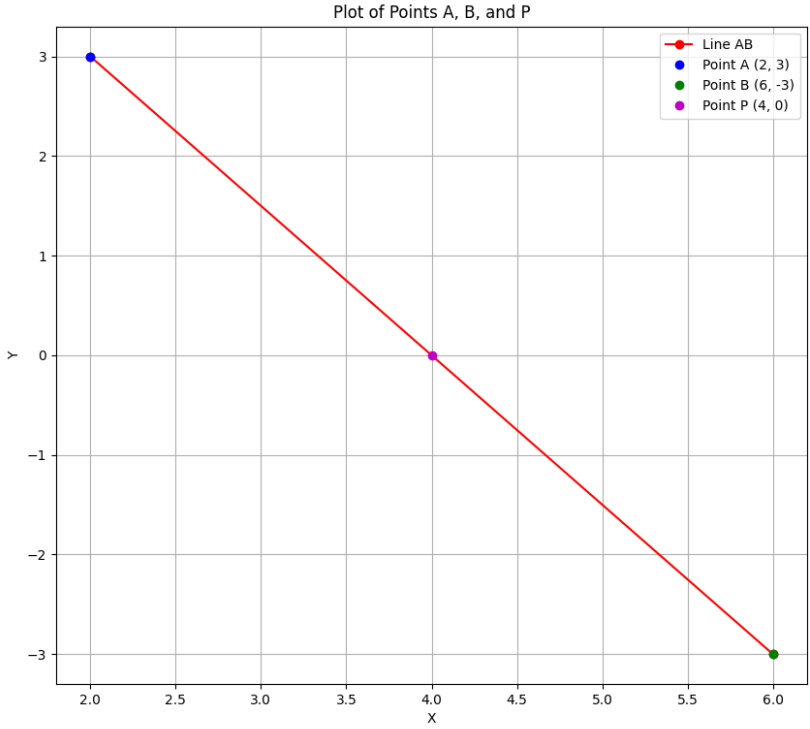
Plot of Points A, B, and P
Line AB
Point A (2, 3)
Point B (6, -3)
Point P (4, 0)
3
2
1
0
−1
−2
−3
Y
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
X

Fig. 0.1: Plot