1.4.21

EE25BTECH11006 - ADUDOTLA SRIVIDYA

Question:
Find the coordinates of the point which divides the line segment joining the points $\mathbf{A}(1,-2,3)$ and $\mathbf{B}(3,4,-5)$ in the ratio 2 : 3
a) internally, and
b) externally.

Solution:
Let

$$\mathbf{A} = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}, \quad \mathbf{B} = \begin{pmatrix} 3 \\ 4 \\ -5 \end{pmatrix}$$

a) Internal Division (2:3)

$$\mathbf{P} = \frac{2\mathbf{B} + 3\mathbf{A}}{5} = \begin{pmatrix} \frac{9}{5} \\ \frac{2}{5} \\ -\frac{1}{5} \end{pmatrix}$$

b) External Division (2:3)

$$\mathbf{Q} = \frac{2\mathbf{B} - 3\mathbf{A}}{2-3} = \begin{pmatrix} -3 \\ -14 \\ 19 \end{pmatrix}$$

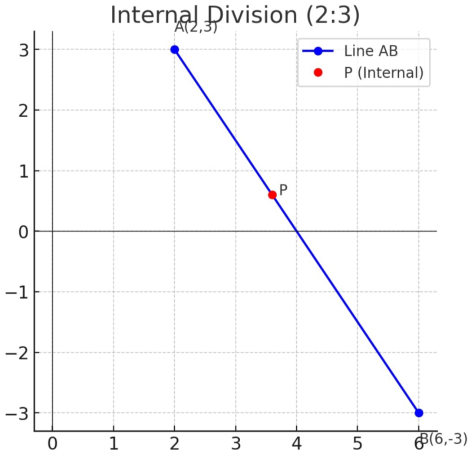

Fig. 0.1: 1

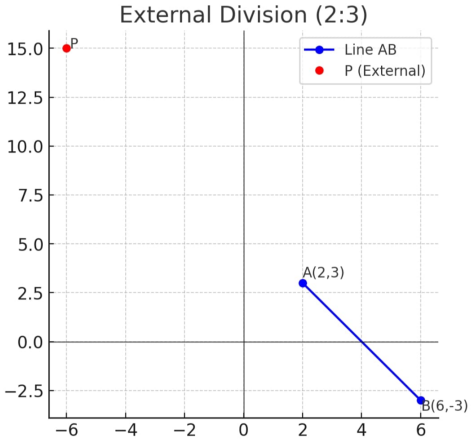

Fig. 0.2: 2

Therefore, the required points are:
Internal: $\left(\frac{9}{5}, \frac{2}{5}, -\frac{1}{5}\right)$, External: $(-3, -14, 19)$.