1.5.34

EE25BTECH11047 - RAVULA SHASHANK REDDY

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Question:

The point P which divides the line segment joining the points $A(2, -5)$ and $B(5, 2)$ in the ratio $2 : 3$ lies in which quadrant?

Solution:
Let O be the origin. Then the position vectors

$$\mathbf{OA} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}, \quad \mathbf{OB} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}.$$

The point P, dividing the segment AB in the ratio $2 : 3$ internally, has the position vector

$$\mathbf{OP} = \frac{2\mathbf{OB} + 3\mathbf{OA}}{3 + 2} = \frac{2\begin{pmatrix} 5 \\ 2 \end{pmatrix} + 3\begin{pmatrix} 2 \\ -5 \end{pmatrix}}{5} = \frac{\begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} 6 \\ -15 \end{pmatrix}}{5} = \frac{\begin{pmatrix} 16 \\ -11 \end{pmatrix}}{5}.$$

Therefore the co-ordinates of P are

$$\left(\frac{16}{5}, -\frac{11}{5} \right).$$

Since $x > 0$ and $y < 0$, P lies in the **IV (fourth) quadrant**.

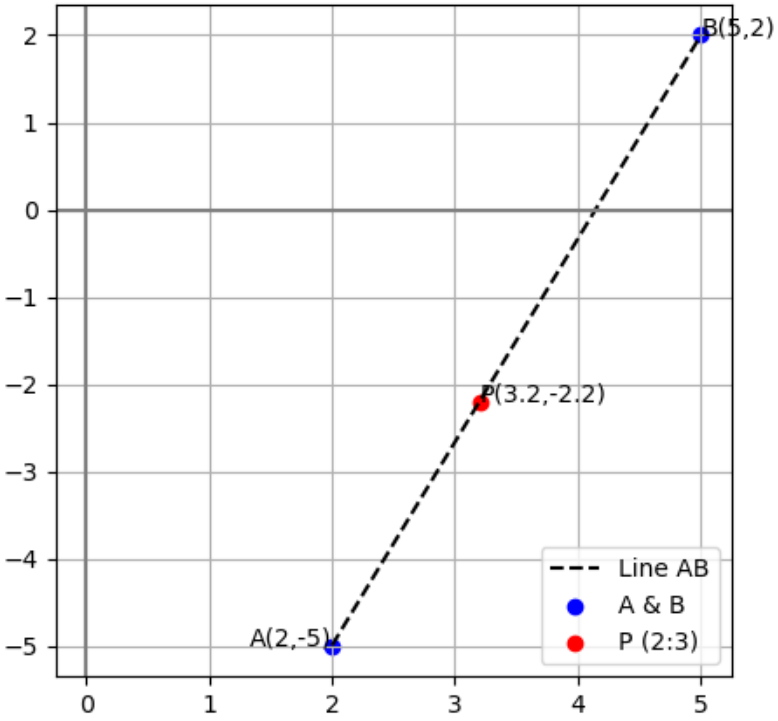

Figure 0.1

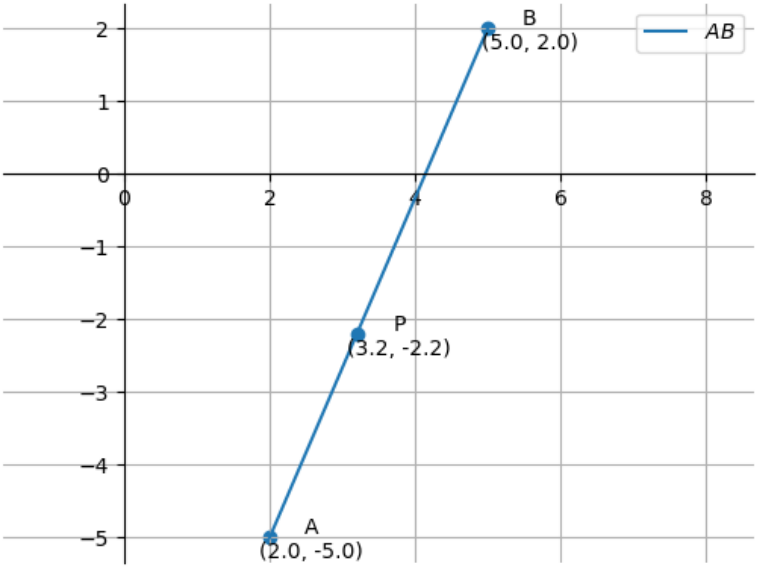

Figure 0.2