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:

Given:

$$\mathbf{A} = \begin{pmatrix} 2 \\ -5 \end{pmatrix} \tag{1}$$

$$\mathbf{B} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} \tag{2}$$

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

$$\mathbf{P} = \frac{\frac{2}{3}\mathbf{B} + \mathbf{A}}{1 + \frac{2}{3}} \tag{3}$$

Thus by the formula

$$\mathbf{P} = \frac{\frac{2}{3}\begin{pmatrix} 5 \\ 2 \end{pmatrix} + \begin{pmatrix} 2 \\ -5 \end{pmatrix}}{1 + \frac{2}{3}} \tag{4}$$

$$\mathbf{P} = \frac{2\begin{pmatrix} 5 \\ 2 \end{pmatrix} + 3\begin{pmatrix} 2 \\ -5 \end{pmatrix}}{5} \tag{5}$$

$$\mathbf{P} = \frac{\begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} 6 \\ -15 \end{pmatrix}}{5} \tag{6}$$

$$\therefore \mathbf{P} = \frac{\begin{pmatrix} 16 \\ -11 \end{pmatrix}}{5}. \tag{7}$$

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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**.