1.2.12

AI25BTECH11006 - Nikhila

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Question

If the points **A**(6,1),**B**(8,2),**C**(9,4) and **D**(p,3) are the vertices of a parallelogram,taken in order. find the value of p .

Solution

The given the points $\mathbf{A}\begin{pmatrix}6\\1\end{pmatrix}, \mathbf{B}\begin{pmatrix}8\\2\end{pmatrix}, \mathbf{C}\begin{pmatrix}9\\4\end{pmatrix}$ and $\mathbf{D}\begin{pmatrix}p\\3\end{pmatrix}$

If ABCD be a parallelogram with AB $\parallel$ CD ,

$$\mathbf{B}-\mathbf{A}=\mathbf{C}-\mathbf{D}$$

Solution

The vector components are:

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 8 \\ 2 \end{pmatrix} - \begin{pmatrix} 6 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} \tag{1}$$

$$\mathbf{C} - \mathbf{D} = \begin{pmatrix} 9 \\ 4 \end{pmatrix} - \begin{pmatrix} p \\ 3 \end{pmatrix} = \begin{pmatrix} 9-p \\ 1 \end{pmatrix} \tag{2}$$

By comparing

$$9 - p = 2 \tag{3}$$

We get

$$p = 7 \tag{4}$$

Graphical Representation

Hence the coordinates of **D** are (7 , 3)