1.1.3.6

AI24BTECH11012-Pushkar Gudla

Question: If $\begin{pmatrix}3\\3\end{pmatrix}$, $\begin{pmatrix}6\\y\end{pmatrix}$, $\begin{pmatrix}x\\7\end{pmatrix}$ and $\begin{pmatrix}5\\6\end{pmatrix}$ are the vertices of a parallelogram taken in order, find the values of x and y. (10, 2011)

Solution: Property: midpoints of diagnol coincide. Let **O** be the midpoint of the diagnols.

$$\mathbf{O} = \frac{\begin{pmatrix}3\\3\end{pmatrix} + \begin{pmatrix}x\\7\end{pmatrix}}{2} \tag{0.1}$$

$$\implies \mathbf{O} = \begin{pmatrix}\frac{3+x}{2}\\5\end{pmatrix}, \text{ And we also have:} \tag{0.2}$$

$$\mathbf{O} = \frac{\begin{pmatrix}6\\y\end{pmatrix} + \begin{pmatrix}5\\6\end{pmatrix}}{2} \tag{0.3}$$

$$\implies \mathbf{O} = \begin{pmatrix}5.5\\\frac{6+y}{2}\end{pmatrix} \tag{0.4}$$

On comparing the two, we get, $x = 8$ (0.5)

$$y = 4 \tag{0.6}$$