

Assignment-2

EE224BTECH11044 - Muthyala Koushik

I. VECTOR ARITHMETIC(CBSE)

- 1) If $(3, 3)$, $(6, y)$, $(x, 7)$ and $(5, 6)$ are the vertices of a parallelogram taken in order, find the values of x and y . (10,2011)

Solution: To find x and y , use the property that the midpoints of the diagonals of parallelogram are equal. Given vertices: $\mathbf{A} \begin{pmatrix} 3 \\ 3 \end{pmatrix}$, $\mathbf{B} \begin{pmatrix} 6 \\ y \end{pmatrix}$, $\mathbf{C} \begin{pmatrix} x \\ 7 \end{pmatrix}$, $\mathbf{D} \begin{pmatrix} 5 \\ 6 \end{pmatrix}$.

$$\text{Midpoint of } \mathbf{AC} : \begin{pmatrix} \frac{3+x}{2} \\ 5 \end{pmatrix}$$

$$\text{Midpoint of } \mathbf{BD} : \begin{pmatrix} \frac{11}{2} \\ \frac{y+6}{2} \end{pmatrix}$$

Equate midpoints:

$$\frac{3+x}{2} = \frac{11}{2} \implies x = 8$$

$$5 = \frac{y+6}{2} \implies y = 4$$

So, $x = 8$ and $y = 4$

