# 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:$\mathbf{A}\begin{pmatrix}3\\3\end{pmatrix}, \mathbf{B}\begin{pmatrix}6\\y\end{pmatrix}, \mathbf{C}\begin{pmatrix}x\\7\end{pmatrix}, \mathbf{D}\begin{pmatrix}5\\6\end{pmatrix}$.

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

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

Equate midpoints:

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

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

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