Question 1.3.5:

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.

Solution:

In a parallelogram, the diagonals bisect each other. Therefore, the midpoint of diagonal joining $(3,3)$ and $(x,7)$ is equal to the midpoint of diagonal joining $(6,y)$ and $(5,6)$. beginalign $(\frac{3+x}{2}, \frac{3+7}{2}) = (\frac{6+5}{2}, \frac{y+6}{2})$ endalign

$$\left(\frac{3+x}{2}, 5\right) = \left(\frac{11}{2}, \frac{y+6}{2}\right)$$

Equating the coordinates, we get:

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

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

Final Answer: $x = 8,\ y = 4$