



Exercise 16C

Question 1:

(i) Let $A(1, 2)$, $B(-2, 3)$ and $C(-3, -4)$ be the vertices of the given ΔABC , then

$(x_1 = 1, y_1 = 2)$, $(x_2 = -2, y_2 = 3)$ and $(x_3 = -3, y_3 = -4)$

$$\begin{aligned}\text{Area of } \Delta ABC &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\ &= \frac{1}{2} [1(3 + 4) - 2(-4 - 2) - 3(2 - 3)] \\ &= \frac{1}{2} [7 + 12 + 3] = \frac{22}{2} = 11 \text{ sq units}\end{aligned}$$

(ii) The coordinates of vertices of ΔABC are $A(-5, 7)$, $B(-4, -5)$ and $C(4, 5)$

Here, $x_1 = -5$, $y_1 = 7$; $x_2 = -4$, $y_2 = -5$; $x_3 = 4$, $y_3 = 5$

$$x = \frac{x_2 + x_1}{2} \quad \text{and} \quad y = \frac{y_2 - y_1}{2}$$

$$1 = \frac{-2 + 2a}{2} \quad \text{and} \quad 2a + 1 = \frac{3b + 4}{2}$$

$$2 = -2 + 2a \quad \text{and} \quad 4a + 2 = 3b + 4 \quad \dots (1)$$

$$a = 2 \quad \dots (2)$$

Putting $a = 2$ in (1), we get

$$4 \times 2 + 2 = 3b + 4 \quad \Rightarrow 10 - 4 = 3b$$

$$\Rightarrow 3b = 6 \quad \Rightarrow b = \frac{6}{3} = 2$$

Hence, $a = 2$ and $b = 2$

(iii) The coordinates of ΔABC are $A(3, 8)$, $B(-4, 2)$ and $C(5, -1)$

Here, $x_1 = 3$, $y_1 = 8$; $x_2 = -4$, $y_2 = 2$, $x_3 = 5$, $y_3 = -1$

$$\begin{aligned}\text{Area of } \Delta ABC &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\ &= \frac{1}{2} [3 \times (2 + 1) + (-4) \times (-1 - 8) + 5 \times (8 - 2)] \\ &= \frac{1}{2} (9 + 36 + 30) = \frac{1}{2} \times 75 = 37.5 \text{ sq. units}\end{aligned}$$

(iv) Let $P(10, -6)$, $Q(2, 5)$ and $R(-1, 3)$ be the vertices of the given ΔPQR . Then,

$$(x_1 = 10, y_1 = -6), (x_2 = 2, y_2 = 5); (x_3 = -1, y_3 = 3)$$

$$\begin{aligned}\text{Area of } \Delta PQR &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\ &= \frac{1}{2} [10(5 - 3) + 2(3 + 6) + (-1)(-6 - 5)] \\ &= \frac{1}{2} (20 + 18 + 11) = \frac{49}{2} = 24.5 \text{ sq units}\end{aligned}$$

***** END *****