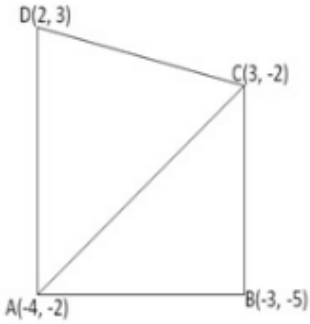
Exercise 16C

Question 2:

(i) Join A and C, then area of quad. ABCD = area of Δ ABC + area of Δ ACD



$$\text{Area of } \Delta ABC = \frac{1}{2}\left[(-4)(-5+2)+(-3)(-2+2)+3(-2+5)\right]$$

$$= \frac{1}{2}(12+0+9) = \frac{21}{2} \text{ sq. unit}$$

$$\text{Area of } \Delta ACD = \frac{1}{2}\left[(-4)(-2-3)+3(3+2)+2(-2+2)\right]$$

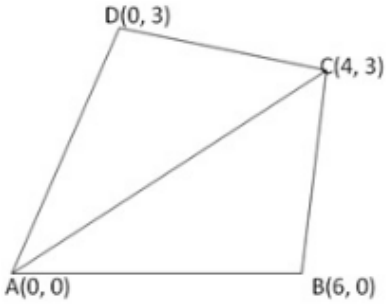
$$= \frac{1}{2}[20+15+0] = \frac{35}{2} \text{ sq unit}$$

$$\text{Area of quad. } ABCD = (\text{area of } \Delta ABC) + (\text{area of } \Delta ACD)$$

$$= \left(\frac{21}{2}+\frac{35}{2}\right)\text{sq units} = \frac{56}{2} \text{ sq units}$$

$$= 28 \text{ sq. units}$$

(ii) The vertices of quad. ABCD are A(0, 0), B(6, 0), C(4, 3) and D(0, 3)



$$\text{Area of } \Delta ABC = \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

when the vertices are $A(x_1, y_1)$, $B(x_2, y_2)$, $C(x_3, y_3)$

$$= \frac{1}{2}[0 \times (0-3) + 6 \times (3-0) + 4(0-0)]$$

$$= \frac{1}{2}[0 + 18 + 0] = 9 \text{ sq. units}$$

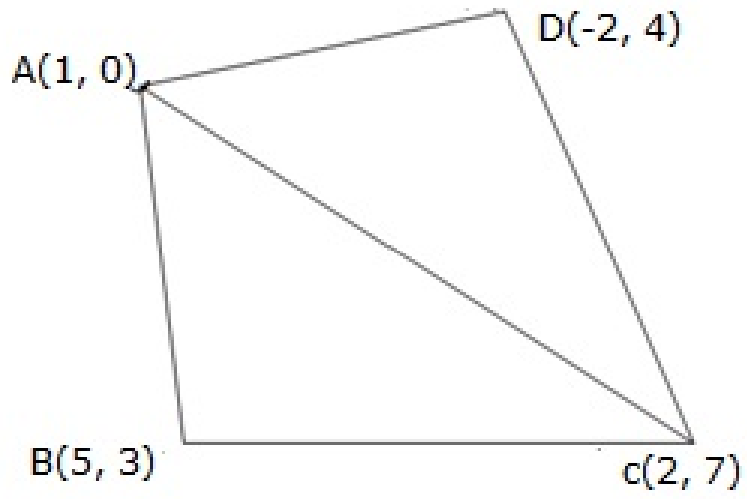
$$\text{Area of } \Delta ACD = \frac{1}{2}[x_1(y_3 - y_4) + x_3(y_4 - y_1) + x_4(y_1 - y_3)]$$

when the vertices are $A(x_1, y_2)$, $C(x_3, y_3)$, $D(x_4, y_4)$

$$= \frac{1}{2}[0 \times (3-3) + 4 \times (3-0) + 0 \times (0-3)]$$

$$= \frac{1}{2}(0 + 12 + 0) = 6$$

Area of quad. ABCD = Area of Δ ABC + Area of Δ ACD
= 9 + 6 = 15 sq. unit
(iii) Vertices of quad. ABCD are A(1, 0), B(5, 3), C(2, 7) and D(-2, 4)



Vertices of Δ ABC are A(1, 0), B(5, 3), C(2, 7)

$$\text{Area of } \Delta ABC$$

$$= \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_2(y_1 - y_2)]$$

$$= \frac{1}{2}[1 \times (3-7) + 5 \times (7-0) + 2(0-3)]$$

$$= \frac{1}{2}[-4 + 35 - 6] = \frac{25}{2}$$

Vertices of Δ ACD are A(1, 0), C(2, 7) and D(-2, 4)

$$\text{Area of } \Delta ACD = \frac{1}{2}[1 \times (7-4) + 2 \times (4-0) + (-2) \times (0-7)]$$

$$= \frac{1}{2}[3 + 8 + 14] = \frac{25}{2}$$

Area of quadrilateral ABCD

$$= \text{Area of } \Delta ABC + \text{Area of } \Delta ACD$$

$$= \frac{25}{2} + \frac{25}{2} = 25 \text{ sq.units}$$

********** END **********