



Exercise 16C

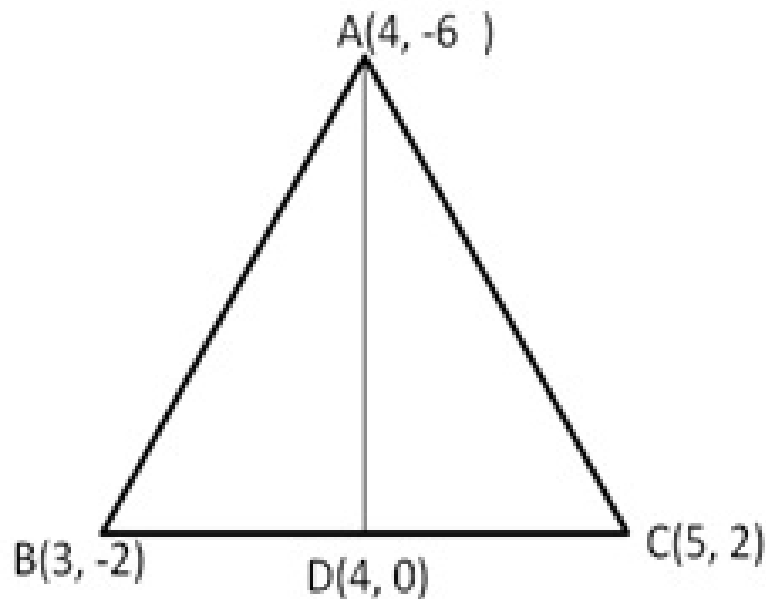
Question 9:

The vertices of ABC are A(4, -6), B(3, -2), C(5, 2)

AD is the median.

D is the midpoint of BC.

the coordinates of point D are $\left(\frac{3+5}{2}, \frac{-2+2}{2}\right) = (4, 0)$



Vertices of ABD are A(4, -6), B(3, -2), D(4, 0)

Area of ΔABD

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

$$= \frac{1}{2} [-8 + 18 - 16] = -3$$

$$= 3 \text{ [omitting -ve sign]}$$

Vertices of ΔADC are (4, -6), (4, 0), (5, 2)

$$\therefore \text{Area of } \Delta ADC = \frac{1}{2} \times [4 \times (0 - 2) + 4(2 + 6) + 5(-6 + 0)]$$

$$= \frac{1}{2} [-8 + 32 - 30] = \frac{1}{2} \times -6 = -3$$

$$= 3 \text{ [omitting -ve sign]}$$

Hence, area of ΔABD = area of ΔADC

Question 10:

Vertices of ΔABC are A(2, 1), B(x, y) and C(7, 5)

$$\begin{aligned}
 \text{Area of } \Delta ABC &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\
 &= \frac{1}{2} [2(y - 5) + x(5 - 1) + 7(1 - y)] \\
 &= \frac{1}{2} [2y - 10 + 4x + 7 - 7y] \\
 &= \frac{1}{2} [4x - 5y - 3]
 \end{aligned}$$

The points A, B and C are collinear

area of $\Delta ABC = 0$

Or $4x - 5y - 3 = 0$

Question 11:

The vertices of ΔABC are $(a, 0)$, $(0, b)$, $C(1, 1)$

$$\begin{aligned}
 \text{Area of } \Delta ABC &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\
 &= \frac{1}{2} [a \times (b - 1) + 0 \times (1 - 0) + 1 \times (0 - b)] \\
 &= \frac{1}{2} [ab - a + b]
 \end{aligned}$$

The points A, B, C are collinear

Area of $\Delta ABC = 0$

$ab - a + b = 0$ $a + b = ab$

Dividing by ab

$$\frac{a}{ab} + \frac{b}{ab} = 1 \text{ or } \frac{1}{b} + \frac{1}{a} = 1$$

Hence, $\frac{1}{a} + \frac{1}{b} = 1$

***** END *****