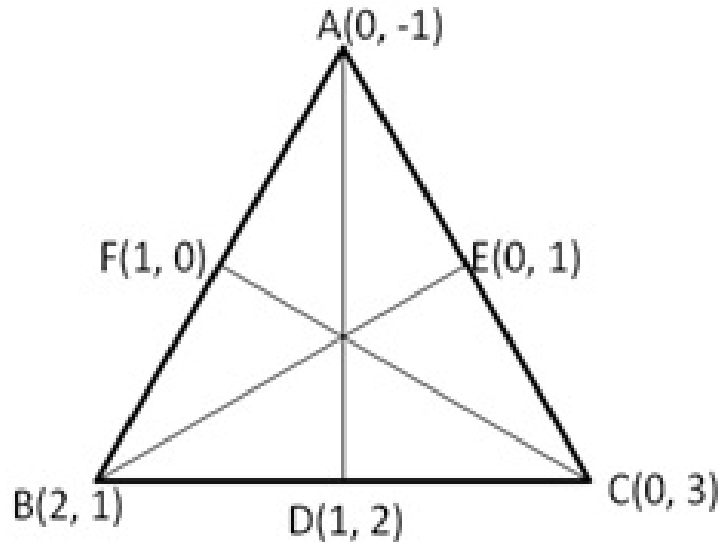




Exercise 16B

Question 20:

Let D, E, F be the midpoint of the side BC, CA and AB respectively in ΔABC .



Then, by the midpoint formula, we have

$$D\left(\frac{2+0}{2}, \frac{1+3}{2}\right), E\left(\frac{0+0}{2}, \frac{3-1}{2}\right), F\left(\frac{0+2}{2}, \frac{-1+1}{2}\right)$$

i.e., $D(1, 2)$, $E(0, 1)$, $F(1, 0)$

Hence the lengths of medians AD, BE and CF are given by

$$AD = \sqrt{(1-0)^2 + (2+1)^2} = \sqrt{1+9} = \sqrt{10} \text{ units}$$

$$BE = \sqrt{(0-2)^2 + (1-1)^2} = \sqrt{4+0} = \sqrt{4} = 2 \text{ units}$$

$$CF = \sqrt{(1-0)^2 + (0-3)^2} = \sqrt{1+9} = \sqrt{10} \text{ units}$$

$$\text{Hence, } AD = \sqrt{10}, \quad BE = 2, \quad CF = \sqrt{10}$$

Question 21:

Here

$$(x_1 = -1, y_1 = 0), (x_2 = 5, y_2 = -2) \text{ and } (x_3 = 8, y_3 = 2)$$

Let $G(x, y)$ be the centroid of ΔABC , then

$$x = \frac{1}{3}(x_1 + x_2 + x_3) = \frac{1}{3}(-1 + 8 + 5) = 4$$

$$y = \frac{1}{3}(y_1 + y_2 + y_3) = \frac{1}{3}(0 - 2 + 2) = 0$$

Hence the centroid of ΔABC is $G(4, 0)$.

Question 22:

Two vertices of ΔABC are A(1, -6) and B(-5, 2) let the third vertex be C(a, b)

Then, the co-ordinates of its centroid are

$$G\left(\frac{1-5+a}{3}, \frac{-6+2+b}{3}\right) \text{ i.e. } G\left(\frac{-4+a}{3}, \frac{-4+b}{3}\right)$$

But given that the centroid is G(-2, 1)

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

$$-4+a = -6 \text{ and } -4+b = 3$$

$$a = -2 \text{ and } b = 7$$

Hence, the third vertex C of ΔABC is (-2, 7).

***** END *****