Exercise 16B

Question 14:
Let P(-6, a) divides the join of A(-3, -1) and B(-8, 9) in the ratio k : 1
Then the coordinates of P are given by

$$\left(\frac{-8k-3}{k+1}, \frac{9k-1}{k+1}\right)$$

But, we are given P is (-6, a)

$$\therefore \frac{-8k-3}{k+1} = -6 \text{ and } \frac{9k-1}{k+1} = a$$

$$\text{Now, } \frac{-8k-3}{k+1} = -6 \Rightarrow 8k+3 = 6k+6$$

$$\Rightarrow 2k = 3 \quad \therefore k = \frac{3}{2}$$

$$\text{Putting } k = \frac{3}{2} \text{ in } \frac{9k-1}{k+1} = a, \text{ we get}$$

$$a = \frac{\left(9 \times \frac{3}{2} - 1\right)}{\left(\frac{3}{2}+1\right)} = \frac{\left(\frac{27-2}{2}\right)}{\left(\frac{3+2}{2}\right)} = \frac{25}{5} = 5$$

Hence, required ratio is 3 : 2 and a = 5

Question 15:
Let P divided the join of line segment A(-4, 3) and B(2, 8) in the ratio k : 1
∴ the point P is

$$\left(\frac{k\times 2+1\times(-4)}{k+1},\frac{k\times 8+1\times 3}{k+1}\right)=\left(\frac{2k-4}{k+1},\frac{8k+3}{k+1}\right)$$

$$\Rightarrow\frac{2k-4}{k+1}=m \quad -----(1)$$

$$\text{and } \frac{8k+3}{k+1}=6$$

$$\text{or } 8k+3=6k+6 \text{ or } 2k=3 \therefore k=\frac{3}{2}$$

Putting value of k in(1)

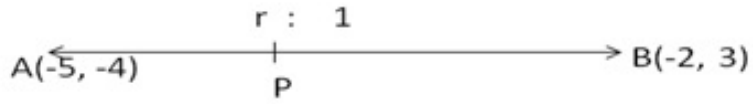
$$\frac{2\times\frac{3}{2}-4}{\frac{3}{2}+1}=m$$

$$m=\frac{3-4}{\frac{5}{2}}$$

$$m=-\frac{2}{5}$$

$$\text{Hence, } m=-\frac{2}{5},\ k=\frac{3}{2}$$

Question 16:
Let P is dividing the given segment joining A(-5, -4) and B(-2, 3) in the ratio r : 1



Coordinates of point P

$$\left(\frac{-2r+1.(-5)}{r+1},\frac{r.3+1\times(-4)}{r+1}\right)\text{i.e.}\left(\frac{-2r-5}{r+1},\frac{3r-4}{r+1}\right)$$

Also, the coordinates of point P are $(-3,k)$

$$\therefore\frac{-2r-5}{r+1}=-3\Rightarrow -2r-5=-3r-3,\ r=2$$

$$\text{and } k=\frac{3r-4}{r+1}=\frac{3\times 2-4}{2+1}=\frac{2}{3}$$

$$\therefore \text{P is dividing AB in the ratio } 2:1 \text{ and } k=\frac{2}{3}$$

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