

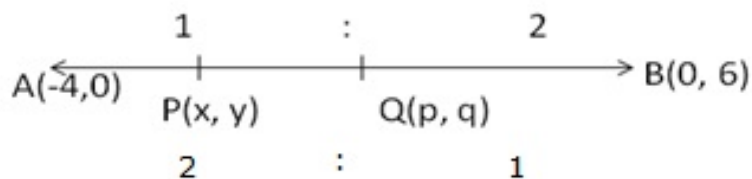


Exercise 16B

Question 4:

Let $P(x, y)$ and $Q(p, q)$ be the point of trisection of line segment AB ($A(-4, 0)$ and $B(0, 6)$)

Then $P(x, y)$ divides AB in the ratio $1 : 2$



Here $m = 1$ and $n = 2$

$(x_1 = -4, y_1 = 0)$ and $(x_2 = 0, y_2 = 6)$

$$\therefore x = \frac{[1 \times 0 + 2 \times (-4)]}{(1+2)} = \frac{-8}{3}$$

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

$\therefore P\left(\frac{-8}{3}, 2\right)$ is the 1st point of trisection AB

Also $Q(p, q)$ divides AB in the ratio $2 : 1$

Here $m = 2$ and $n = 1$

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

$$\text{and } q = \frac{[2 \times 6 + 1 \times 0]}{(2+1)} = \frac{12}{3} = 4$$

$\therefore Q\left(\frac{-4}{3}, 4\right)$ is the 2nd point of trisection of AB

Hence, $P\left(\frac{-8}{3}, 2\right)$ and $Q\left(\frac{-4}{3}, 4\right)$ are required points of trisection of AB

Question 5:

Point P divides the join of $A(3, -4)$ and $B(1, 2)$ in the ratio $1 : 2$.

Coordinates of P are:

$$\left(\frac{1 \times 1 + 2 \times 3}{1+2}, \frac{1 \times 2 + 2 \times (-4)}{1+2} \right) \text{ or } \left(\frac{7}{3}, \frac{-6}{3} \right) \text{ or } \left(\frac{7}{3}, -2 \right)$$

Also the point P is $(p, -2) \Rightarrow p = \frac{7}{3}$

Further Q is the midpoint of PB when

$P\left(\frac{7}{3}, -2\right)$ and $B(1, 2)$

\therefore Coordinates of Q are $\left(\frac{\frac{7}{3} + 1}{2}, \frac{-2 + 2}{2} \right) \text{ or } \left(\frac{5}{3}, 0 \right)$

Also, Q is $\left(\frac{5}{3}, q \right) \Rightarrow q = 0$

hence, $p = \frac{7}{3}$ and $q = 0$

Question 6:

Let (x, y) be the coordinates of a point P which divides the line joining $A(4, -5)$ and $B(4, 5)$ such that $AP : AB = 2 : 5$



$$\text{Now, } \frac{AP}{AB} = \frac{2}{5} \text{ or } \frac{AP}{AP+PB} = \frac{2}{5} \therefore AB = AP+PB$$

$$\text{or } 5AP = 2AP + 2PB$$

$$\Rightarrow 3AP = 2PB$$

$$\therefore \frac{AP}{PB} = \frac{2}{3}$$

\therefore Coordinates of point P are given by

$$x = \frac{2 \times 4 + 3 \times 4}{2+3} = \frac{8+12}{5} = \frac{20}{5} = 4$$

$$y = \frac{2 \times 5 + 3 \times (-5)}{2+3} = \frac{10-15}{5} = \frac{-5}{5} = -1$$

Coordinates of P are $(4, -1)$

***** END *****