



### Exercise 16B

Question 1:

The end points of AB are A(-1,7) and B(4, -3).

$$\therefore (x_1 = -1), (y_1 = 7) \text{ and } (x_2 = 4, y_2 = -3)$$

$$\text{Also } m = 2 \text{ and } n = 3$$



Let the required point be P(x, y)

By section formula, we have

$$\Rightarrow x = \frac{(mx_2 + nx_1)}{(m+n)}, y = \frac{(my_2 + ny_1)}{(m+n)}$$

$$\Rightarrow x = \frac{2 \times 4 + 3 \times (-1)}{(2+3)}, y = \frac{(2 \times -3 + 3 \times 7)}{(2+3)}$$

$$\Rightarrow x = \frac{8-3}{5}, y = \frac{-6+21}{5}$$

$$\Rightarrow x = \frac{5}{5}, y = \frac{15}{5} \text{ or } x = 1, y = 3$$

Hence the required point is P(1, 3).

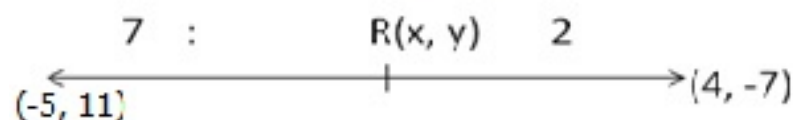
Question 2:

The end points of PQ are P(-5, 11) and Q(4, -7).

$$\therefore (x_1 = -5, y_1 = 11) \text{ and } (x_2 = 4, y_2 = -7)$$

$$\text{Also, } m = 7 \text{ and } n = 2$$

let the required point be R(x, y)



By section formula, we have

$$x = \frac{(mx_2 + nx_1)}{(m+n)}, y = \frac{(my_2 + nx_2)}{(m+n)}$$

$$x = \frac{[7 \times 4 + 2 \times (-5)]}{(7+2)}, y = \frac{[7 \times (-7) + 2 \times 11]}{(7+2)}$$

$$x = \frac{28-10}{9} = \frac{18}{9} = 2, y = \frac{(-49+22)}{9} = \frac{-27}{9} = -3$$

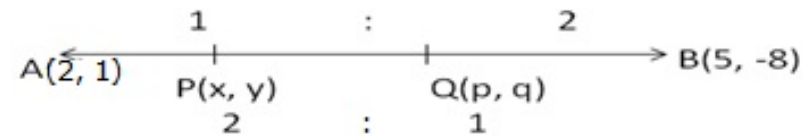
Hence the required point is (2, -3).

Question 3:

Let P(x, y) and Q(p, q) be the points of trisection of the line segment.

Joining A(2,1) and B(5, -8)

The, P(x, y) divide AB in the ratio 1 : 2.



By section formula, we have

$$x = \frac{(mx_2 + nx_1)}{(m+n)}, \quad y = \frac{(my_2 + ny_1)}{(m+n)}$$

Here m = 1 and n = 2

$$\therefore x = \frac{[1 \times 5 + 2 \times 2]}{(1+2)}$$

$$x = \frac{9}{3} = 3$$

$$\text{and } y = \frac{[1 \times (-8) + 2 \times 1]}{(1+2)}$$

$$y = \frac{-6}{3} = -2$$

P(3, -2) is the 1st point of trisection of AB

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

Here m = 2 and n = 1

(x1=2, y1=1) and (x2=5, y2=-8)

$$\therefore p = \frac{[2 \times 5 + 1 \times 2]}{(2+1)} = \frac{12}{3} = 4 \quad \text{and}$$

$$q = \frac{[2 \times (-8) + 1 \times 1]}{(2+1)} = \frac{-15}{3} = -5$$

Q(4, -5) is the 2nd point of trisection of AB

Hence P(3, -2) and Q(4, -5) are the required point.

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