

CHAPTER-7  
COORDINATE GEOMETRY

### Exercise 7.2.9

1. Find the coordinates of the point which divides the line segment joining  $(-2, 2)$  and  $(2, 8)$  into four equal parts

**Solution:**

Let the points A,B,C which divide the line into 4 equal parts

Ratio of PAQ = 3:1

Ratio of PBQ = 2:2

Ratio of PCQ = 1:3

coordinates and ratio are given as:

$$\mathbf{P} = \begin{pmatrix} -2 \\ 2 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 2 \\ 8 \end{pmatrix}, \quad (1)$$

Using section formula for n:

$$n = \frac{3}{1} \quad (2)$$

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1 + n} \quad (3)$$

$$= \frac{1}{1 + \frac{3}{1}} \left( \begin{pmatrix} 2 \\ 8 \end{pmatrix} + \frac{3}{1} \begin{pmatrix} -2 \\ 2 \end{pmatrix} \right) \quad (4)$$

$$= \frac{1}{\frac{4}{1}} \left( \begin{pmatrix} 2 \\ 8 \end{pmatrix} + \frac{1}{1} \begin{pmatrix} -6 \\ 6 \end{pmatrix} \right) \quad (5)$$

$$= \frac{1}{4} \cdot \begin{pmatrix} -4 \\ 14 \end{pmatrix} \quad (6)$$

$$= \begin{pmatrix} -1 \\ \frac{7}{2} \end{pmatrix} \quad (7)$$

Using section formula for n:

$$n = \frac{2}{2} \quad (8)$$

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1 + n} \quad (9)$$

$$= \frac{1}{1 + \frac{2}{2}} \left( \binom{2}{8} + \frac{2}{2} \binom{-2}{2} \right) \quad (10)$$

$$= \frac{1}{\frac{4}{2}} \left( \binom{2}{8} + \frac{1}{1} \binom{-2}{2} \right) \quad (11)$$

$$= \frac{1}{2} \cdot \binom{0}{10} \quad (12)$$

$$= \binom{0}{5} \quad (13)$$

Using section formula for n:

$$n = \frac{1}{3} \quad (14)$$

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1 + n} \quad (15)$$

$$= \frac{1}{1 + \frac{1}{3}} \left( \binom{2}{8} + \frac{1}{3} \binom{-2}{2} \right) \quad (16)$$

$$= \frac{1}{\frac{4}{3}} \left( \binom{2}{8} + \binom{\frac{-2}{3}}{\frac{2}{3}} \right) \quad (17)$$

$$= \frac{3}{4} \cdot \binom{\frac{4}{3}}{\frac{26}{3}} \quad (18)$$

$$= \binom{1}{\frac{13}{2}} \quad (19)$$

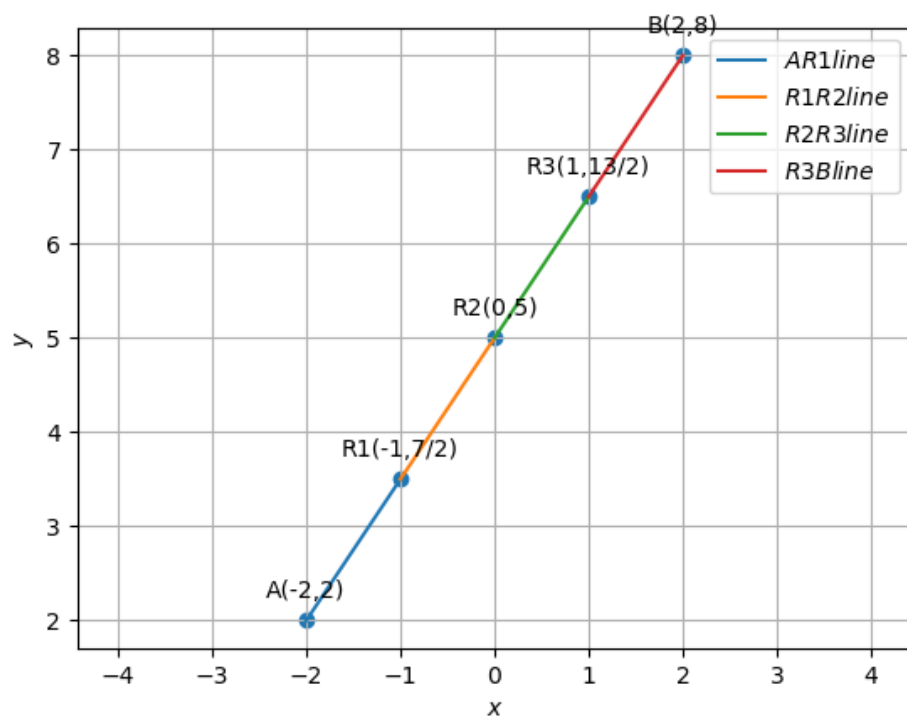


Figure 1: