Coordinate Geometry

10^{th} Maths - Chapter 7

This is Problem-4 from Exercise 7.2

1. Find the ratio in which the line segement joining the points $\begin{pmatrix}-3\\10\end{pmatrix}$ and $\begin{pmatrix}6\\-8\end{pmatrix}$ is divided by $\begin{pmatrix}-1\\6\end{pmatrix}$.

   Solution:
   The input parameters for this problem are available in Table (1)

Symbol	Value	Description
P	$\begin{pmatrix}-3\\10\end{pmatrix}$	First point
Q	$\begin{pmatrix}6\\-8\end{pmatrix}$	Second point
R	$\begin{pmatrix}-1\\6\end{pmatrix}$	Desired point

Table 1

Using section formula,

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1+n} \tag{1}$$

and the ratio of line segment when divide by point $\mathbf{R}$,

$$\mathbf{n} = \frac{\mathbf{Q} - \mathbf{R}}{\mathbf{R} - \mathbf{P}} \tag{2}$$

$$\implies \frac{\begin{pmatrix} 6 \\ -8 \end{pmatrix} - \begin{pmatrix} -1 \\ 6 \end{pmatrix}}{\begin{pmatrix} -1 \\ 6 \end{pmatrix} - \begin{pmatrix} -3 \\ 10 \end{pmatrix}} \tag{3}$$

$$\implies \frac{\begin{pmatrix} -7 \\ 14 \end{pmatrix}}{\begin{pmatrix} -2 \\ 4 \end{pmatrix}} \implies \begin{pmatrix} \frac{7}{2} \\ \frac{7}{2} \end{pmatrix} \tag{4}$$

Hence the ratio $\mathbf{n}$ is $\frac{7}{2}$.

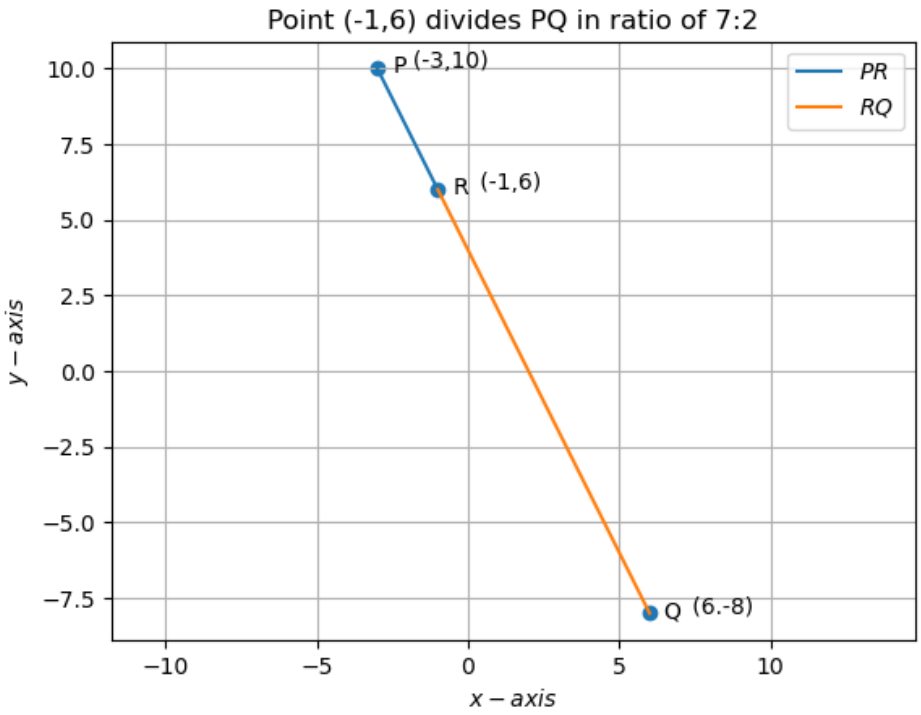
Point (-1,6) divides PQ in ratio of 7:2
P (-3,10)
R (-1,6)
Q (6.-8)
PR
RQ
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10
−5
0
5
10
y − axis
x − axis

Figure 1