

Coordinate Geometry

10th Maths - Chapter 7

This is Problem-4 from Exercise 7.2

1. Find the ratio in which the line segment 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,

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

Substituting the values of \mathbf{P} , \mathbf{Q} and \mathbf{R} in eq-1

$$\begin{pmatrix} -1 \\ 6 \end{pmatrix} = \frac{\begin{pmatrix} -3 \\ 10 \end{pmatrix} + \mathbf{n} \begin{pmatrix} 6 \\ -8 \end{pmatrix}}{1 + \mathbf{n}} \quad (2)$$

$$\Rightarrow \begin{pmatrix} -1 \\ 6 \end{pmatrix} = \frac{1}{1 + \mathbf{n}} \left(\begin{pmatrix} -3 \\ 10 \end{pmatrix} + \mathbf{n} \begin{pmatrix} 6 \\ -8 \end{pmatrix} \right) \quad (3)$$

Simplifying the eq-3 yeilds,

$$\begin{aligned} -1 &= \frac{-3 + 6\mathbf{n}}{1 + \mathbf{n}} \\ \Rightarrow \mathbf{n} &= \frac{2}{7} \end{aligned} \quad (4)$$

and also,

$$\begin{aligned} 6 &= \frac{10 - 8\mathbf{n}}{1 + \mathbf{n}} \\ \Rightarrow \mathbf{n} &= \frac{2}{7} \end{aligned} \quad (5)$$

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

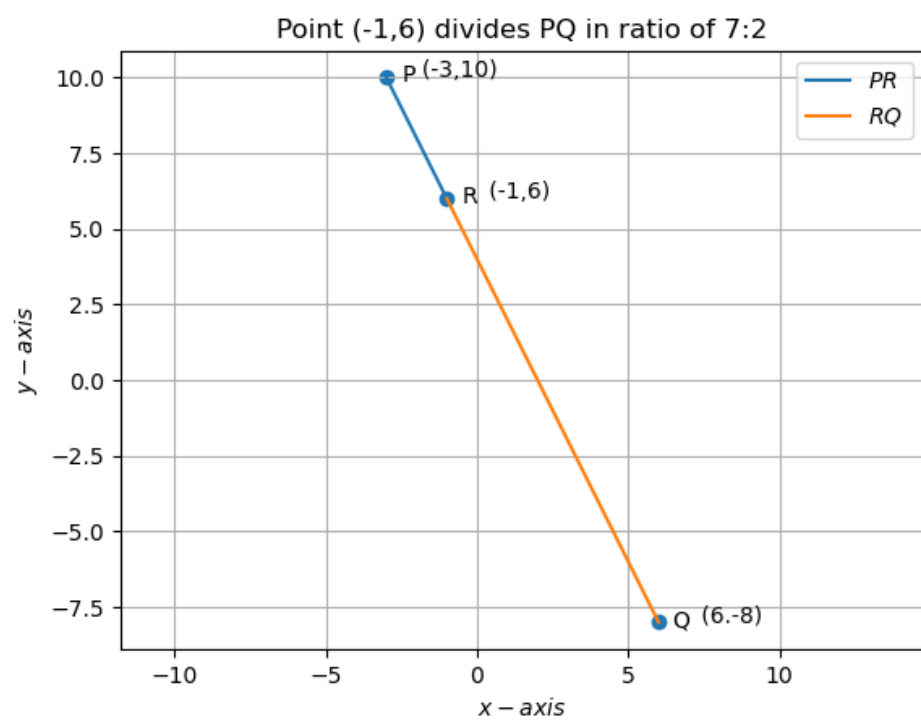


Figure 1