Question 1.4.15

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Question:

The point which divides the line segment joining the points $\mathbf{P}(7, -6)$ and $\mathbf{Q}(3, 4)$ in the ratio $1 : 2$ internally lies in which quadrant?

Solution:

The point $\mathbf{C}$ that divides points $\mathbf{P}$ and $\mathbf{Q}$ in the ratio $l : m$ is

$$\mathbf{C} = \frac{m\mathbf{P} + l\mathbf{Q}}{l + m} \tag{1}$$

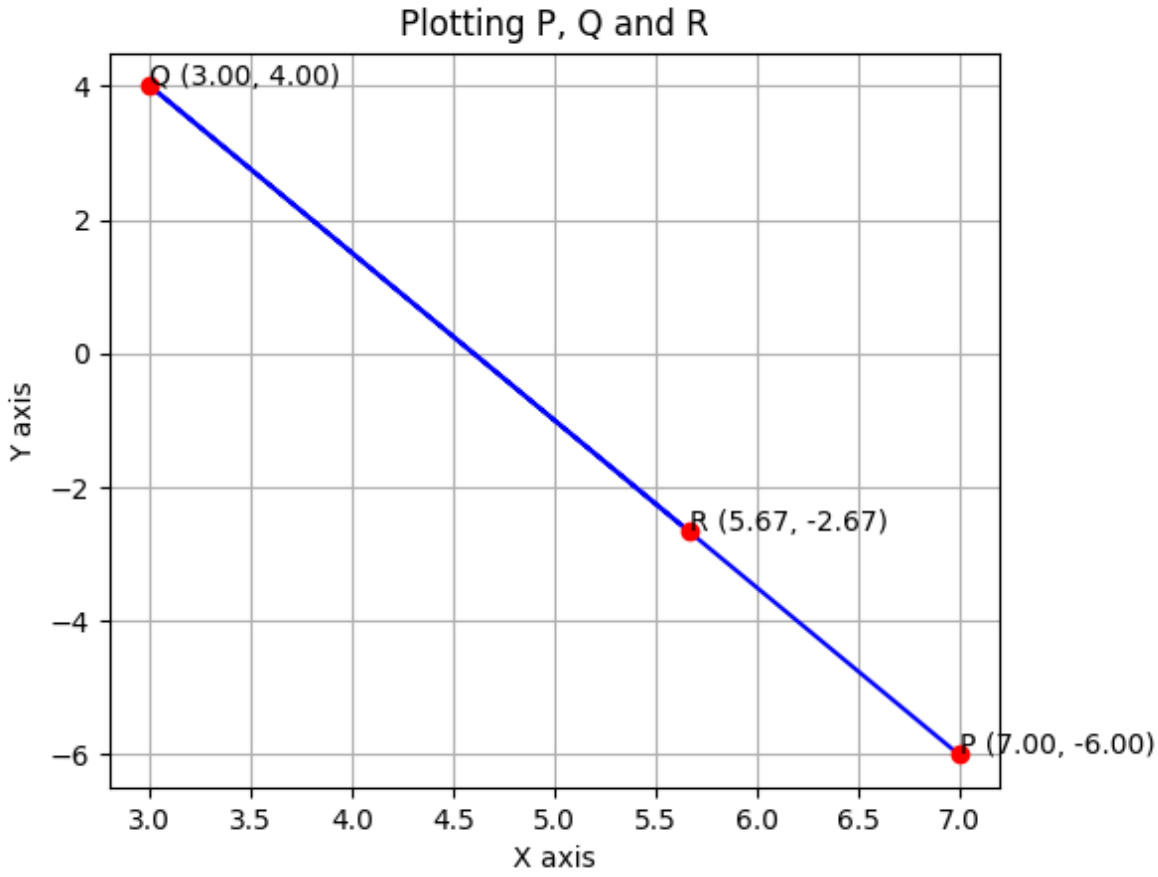
$\therefore$ The point $\mathbf{R}$ dividing $\mathbf{P}$ and $\mathbf{Q}$ in the ratio $1 : 2$ is

$$\mathbf{R} = \frac{2 \cdot \mathbf{P} + 1 \cdot \mathbf{Q}}{1 + 2} \tag{2}$$

$$\mathbf{R} = \begin{pmatrix} \frac{17}{3} \\ -\frac{8}{3} \end{pmatrix} \tag{3}$$

Clearly this point lies in the 4^{th} quadrant.

Plot:


Plotting P, Q and R
Q (3.00, 4.00)
R (5.67, -2.67)
P (7.00, -6.00)
Y axis
X axis
4
2
0
−2
−4
−6
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0