1-1.9-6

EE24BTECH11005 - Arjun Pavanje

Question:
If $\mathbf{Q} = (0, 1)$ is equidistant from $\mathbf{P} = (5, -3)$ and $\mathbf{R} = (x, 6)$, find the value of x.
Solution:

Variable	Description
Q	$(0, 1)$ point
P	$(5, -3)$ point
R	$(x, 6)$ point
x	value to be found

TABLE I: Variables Used

As, **Q** is equidistant from **P**, **R**

$$\|Q - P\| = \|Q - R\| \tag{1}$$

$$\sqrt{(Q-P)^T (Q-P)} = \sqrt{(Q-R)^T (Q-R)} \tag{2}$$

$$(Q - P) = \begin{pmatrix} -5 \\ 4 \end{pmatrix}, (Q - R) = \begin{pmatrix} -x \\ -5 \end{pmatrix}$$

Putting values into equation (2) and squaring,

$$25 + 16 = x^2 + 25 \tag{3}$$

$$x^2 = 16 \tag{4}$$

$$x = \pm 4 \tag{5}$$

The required values of x are $+4, -4$

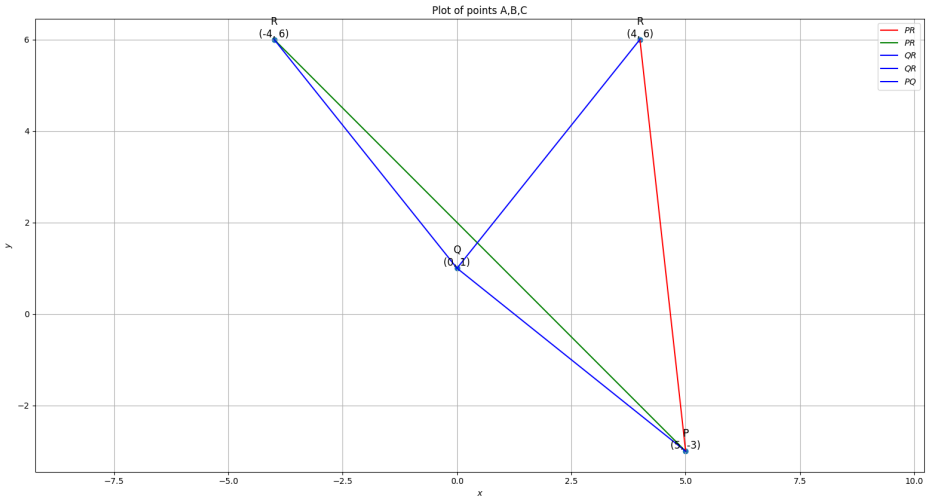

Fig. 1: Plot of Triangle ABC, medians