

Assignment 1

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Solution:

$$\text{Vector}, P = \begin{pmatrix} 7 \\ 6 \end{pmatrix}$$

$$\text{Vector}, Q = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$$

A point on the X - axis is equidistant to both P and Q .

Need to find x .

$$\Rightarrow \left\| \begin{pmatrix} x \\ 0 \end{pmatrix} - \begin{pmatrix} 7 \\ 6 \end{pmatrix} \right\|^2 = \left\| \begin{pmatrix} x \\ 0 \end{pmatrix} - \begin{pmatrix} 3 \\ 4 \end{pmatrix} \right\|^2$$

$$\Rightarrow \|x\|^2 + \left\| \begin{pmatrix} 7 \\ 6 \end{pmatrix} \right\|^2 - 2 \begin{pmatrix} 7 & 6 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix} = \|x\|^2 + \left\| \begin{pmatrix} 3 \\ 4 \end{pmatrix} \right\|^2 - 2 \begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix}$$

$$\Rightarrow 7^2 + 6^2 - 2 \begin{pmatrix} 7 & 6 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix} = 3^2 + 4^2 - 2 \begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix}$$

$$\Rightarrow 85 - 2 \begin{pmatrix} 7 & 6 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix} = 25 - 2 \begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix}$$

$$\Rightarrow 60 = \begin{pmatrix} 8 & 4 \end{pmatrix} \begin{pmatrix} x \\ 0 \end{pmatrix}$$

$$\Rightarrow 8x = 60$$

$$\Rightarrow x = 15/2$$

Therefore, the vector equidistant to both P and Q is $\begin{pmatrix} 15/2 \\ 0 \end{pmatrix}$

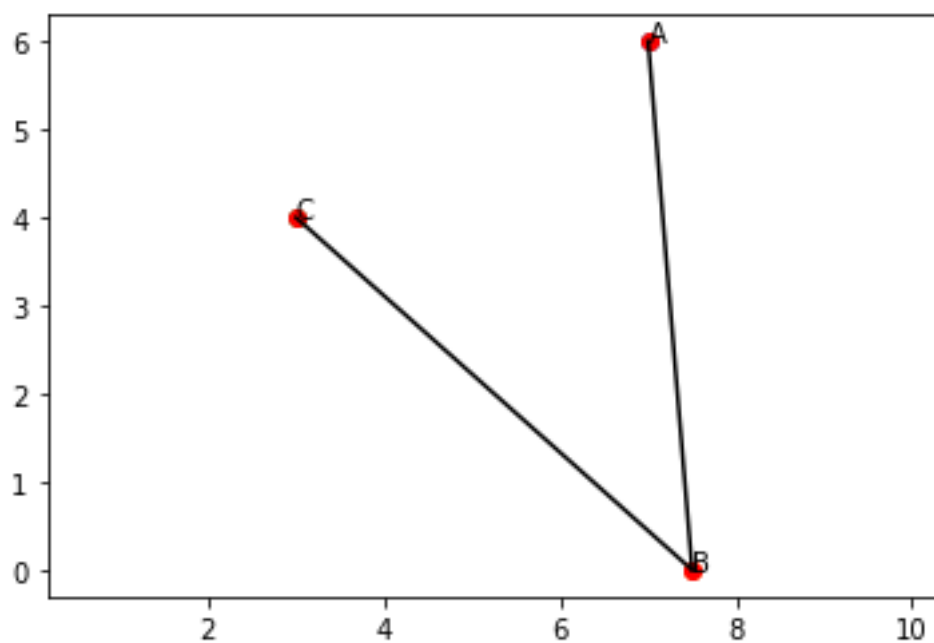


Figure 1: Plot representing the Points