1.4.19

EE25BTECH11004 - Aditya Appana

August 26, 2025

Question

Find a point on the X axis, which is equidistant from the points

$$\begin{pmatrix}7\\6\end{pmatrix} \text{ and } \begin{pmatrix}3\\4\end{pmatrix}$$

Solution

Let vectors be

$$\mathbf{P} = \begin{pmatrix}7\\6\end{pmatrix} \tag{1}$$

$$\mathbf{Q} = \begin{pmatrix}3\\4\end{pmatrix} \tag{2}$$

We need to find the point $\mathbf{R}$ on the X-axis which is equidistant from $\mathbf{P}$ and $\mathbf{Q}$ The formula to calculate the x-coordinate of the point $\mathbf{R}$ is

$$x = \frac{\|\mathbf{P}\|^2 - \|\mathbf{Q}\|^2}{2(\mathbf{P}-\mathbf{Q})^{\mathbf{T}}\mathbf{e_1}}$$

Substituting $\mathbf{P}, \mathbf{Q}$, and e_1 in this formula :

$$x = \frac{7^2 + 6^2 - (3^2 + 4^2)}{2\begin{pmatrix}4\\2\end{pmatrix}^T \begin{pmatrix}1\\0\end{pmatrix}}$$

$$= \frac{60}{8}$$

$$= 7.5$$

Therefore, the required point is (7.5,0)

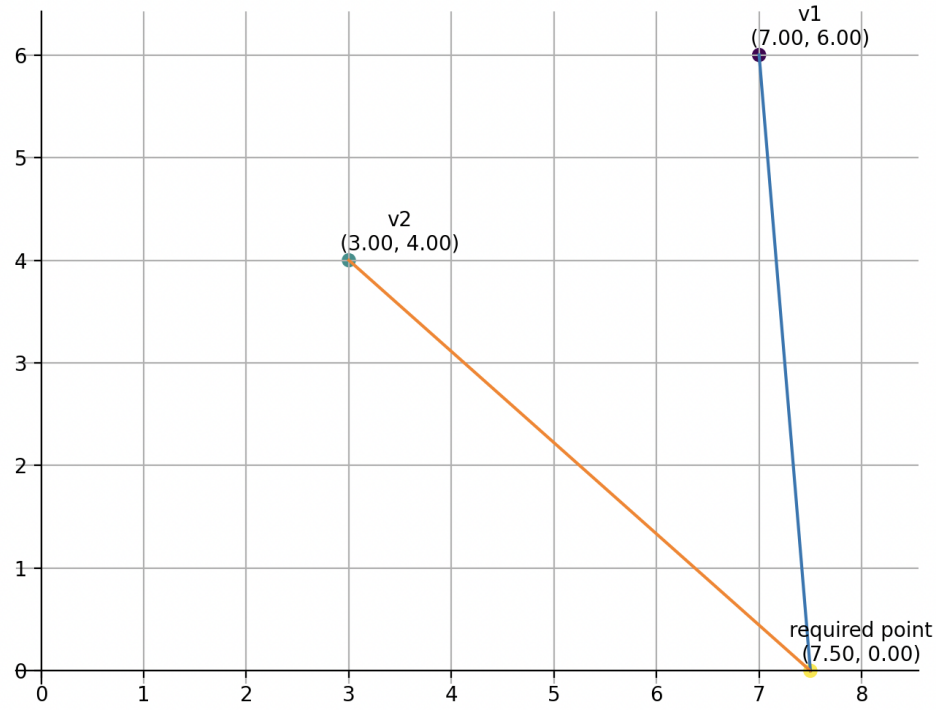

Figure 1: Plot