

Sep 2022

MATRIX ASSIGNMENT

Problem Statement:

Find a point on the X-axis, which is equidistant from the points $\begin{pmatrix} 7 \\ 6 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$

Solution:

Given points $A = \begin{pmatrix} 7 \\ 6 \end{pmatrix}$ and $B = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

Since for any point lying on x-axis $y=0$

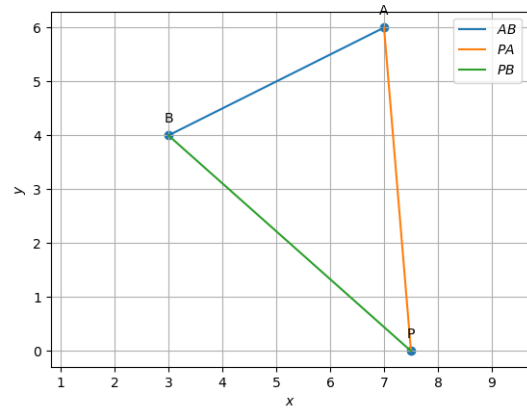
Distance between the points $\begin{pmatrix} 7 \\ 6 \end{pmatrix}$ and $\begin{pmatrix} x \\ 0 \end{pmatrix}$ = Distance between the points $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} x \\ 0 \end{pmatrix}$

$$A = \begin{pmatrix} 7 \\ 6 \end{pmatrix} \Rightarrow 7\vec{i} + 6\vec{j}$$

$$B = \begin{pmatrix} 3 \\ 4 \end{pmatrix} \Rightarrow 3\vec{i} + 4\vec{j}$$

Consider P on x-axis $P \begin{pmatrix} x \\ 0 \end{pmatrix}$

$$|AP| = |BP|$$



$$A \begin{pmatrix} 7 \\ 6 \end{pmatrix} \quad |A_0| = \sqrt{(7-x)^2 + (6-0)^2}$$

$$B \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad |B_0| = \sqrt{(3-x)^2 + (4-0)^2}$$

$$|A_0| = |B_0|$$

$$(7-x)^2 + 36 = (3-x)^2 + 16$$

$$(7-x)^2 + 20 = (3-x)^2$$

$$49 + x^2 - 14x + 20 = 9 + x^2 - 6x$$

$$60 = 8x$$

$$x = 60/8$$

$$x = 7.5$$

<https://github.com/hari1847/hari/blob/main/matrices/hari.py>