Assignment 1

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Find Python Codes from below link

https://raw.githubusercontent.com/jaisai1337/IITH/
main/SU/Assignment1/code.py

and Latex codes from below link

https://raw.githubusercontent.com/jaisai1337/IITH/
main/SU/Assignment1/main.tex

1 EXAMPLES 1

1.1 Question 1

Find the value of k, if the point P(2, 4) is equidistant from the points A(5, k) and B(k, 7).

$$Given, \mathbf{A} = \begin{pmatrix} 5 \\ k \end{pmatrix}, \mathbf{B} = \begin{pmatrix} k \\ 7 \end{pmatrix} \ and \ \mathbf{P} = \begin{pmatrix} 2 \\ 4 \end{pmatrix} \quad (1.1.1)$$

1.2 Solution

Given points A and B are equidistant from the point P
Therefore PA = PB

$$\|\mathbf{P} - \mathbf{A}\| = \|\mathbf{P} - \mathbf{B}\| \quad (1.2.1)$$

From (1.2.1)

$$\sqrt{(\mathbf{P} - \mathbf{A})^\top (\mathbf{P} - \mathbf{A})} = \sqrt{(\mathbf{P} - \mathbf{B})^\top (\mathbf{P} - \mathbf{B})}$$
$$(1.2.2)$$

$$\sqrt{\left(-3 \ \ (4 - k)\right)\begin{pmatrix} -3 \\ 4 - k \end{pmatrix}} = \sqrt{\left((2 - k) \ \ -3\right)\begin{pmatrix} 2 - k \\ -3 \end{pmatrix}}$$
$$(1.2.3)$$

$$\sqrt{9 + (4 - k)^2} = \sqrt{(2 - k)^2 + 9} \quad (1.2.4)$$

$$9 + (4 - k)^2 = (2 - k)^2 + 9 \quad (1.2.5)$$

$$(4 - k)^2 = (2 - k)^2 \quad (1.2.6)$$

$$k^2 - 8k + 16 = k^2 - 4k + 4 \quad (1.2.7)$$

$$-8k + 16 = -4k + 4 \quad (1.2.8)$$

$$4k = 12 \quad (1.2.9)$$

$$\therefore k = 3$$