

Assignment 3

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Find Python Codes from below link

[https://github.com/Hruday-Beeravelli/
INTERNSHIP-IITH-1/blob/main/
Assignment3/A3.py](https://github.com/Hruday-Beeravelli/INTERNSHIP-IITH-1/blob/main/Assignment3/A3.py)

and Latex codes from below link

[https://github.com/Hruday-Beeravelli/
INTERNSHIP-IITH-1/blob/main/
Assignment3/A3.tex](https://github.com/Hruday-Beeravelli/INTERNSHIP-IITH-1/blob/main/Assignment3/A3.tex)

Where $\mathbf{X} = \begin{pmatrix} x \\ y \end{pmatrix}$

For M to satisfy the Equation (1.2.5)

$$0 = \begin{pmatrix} 1 & -1 \end{pmatrix} \mathbf{M} + 1 \quad (1.2.6)$$

$$= \begin{pmatrix} 1 & -1 \end{pmatrix} \begin{pmatrix} 2.5 \\ 3.5 \end{pmatrix} + 1 \quad (1.2.7)$$

$$= 2.5 - 3.5 + 1 \quad (1.2.8)$$

$$= -1 + 1 \quad (1.2.9)$$

$$0 \quad (1.2.10)$$

$$= 0 \quad (1.2.11)$$

1 EXAMPLES 1

1.1 Question 23

Prove that the coordinates, x and y , of the middle point of the line joining the point $(2,3)$ to the point $(3,4)$ satisfy the equation

$$x - y + 1 = 0 \quad (1.1.1)$$

1.2 Solution

Let M be coordinates of midpoint of line joining A and B

$$\mathbf{M} = \frac{\mathbf{B} + \mathbf{A}}{2} \quad (1.2.1)$$

$$\text{Let } \mathbf{A} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$$

From (1.2.5)

$$\mathbf{M} = \frac{\begin{pmatrix} 3 \\ 4 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix}}{2} \quad (1.2.2)$$

$$= \frac{\begin{pmatrix} 5 \\ 7 \end{pmatrix}}{2} \quad (1.2.3)$$

$$\mathbf{M} = \begin{pmatrix} \frac{5}{2} \\ \frac{7}{2} \end{pmatrix} = \begin{pmatrix} 2.5 \\ 3.5 \end{pmatrix} \quad (1.2.4)$$

Equation (1.1.1) can be written as

$$\begin{pmatrix} 1 & -1 \end{pmatrix} \mathbf{X} + 1 = 0 \quad (1.2.5)$$

Since $LHS = RHS$, Midpoint of the line AB satisfies Equation (1.1.1)

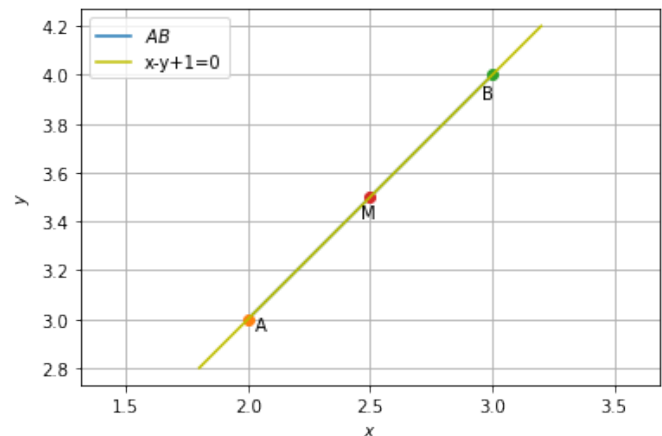


Fig. 0