

ASSIGNMENT-1

C.RAMYA TULASI

Download all python codes from

<https://github.com/sachinomdubey/Matrix-theory/codes>

and latex-tikz codes from

<https://github.com/sachinomdubey/Matrix-theory>

Now, Vertices of given $\triangle LMN$ can be written as,

$$\mathbf{L} = \begin{pmatrix} 0 \\ l \end{pmatrix} = \begin{pmatrix} 0 \\ 4 \end{pmatrix}, \mathbf{M} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{N} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \quad (2.0.16)$$

Now, $\triangle LMN$ can be plotted using vertices LM , MN and LN .

1 QUESTION NO-2.23

Construct $\triangle LMN$ right angled at M such that $LN = 5$ and $MN = 3$.

2 SOLUTION

Let

$$\mathbf{L} = \begin{pmatrix} 0 \\ l \end{pmatrix}, \mathbf{M} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{N} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \quad (2.0.1)$$

Now,

$$\|\mathbf{N} - \mathbf{M}\|^2 = \|\mathbf{N}\|^2 = 3^2 = 9 \quad (2.0.2)$$

$$\|\mathbf{L} - \mathbf{M}\|^2 = \|\mathbf{L}\|^2 = l^2 \quad (2.0.3)$$

We know,

$$\|\mathbf{L} - \mathbf{N}\|^2 = (\mathbf{L} - \mathbf{N})^T (\mathbf{L} - \mathbf{N}) \quad (2.0.4)$$

$$= \mathbf{L}^T \mathbf{L} + \mathbf{N}^T \mathbf{N} - \mathbf{L}^T \mathbf{N} - \mathbf{L}^T \mathbf{N} \quad (2.0.5)$$

$$= \|\mathbf{L}\|^2 + \|\mathbf{N}\|^2 - 2\mathbf{L}^T \mathbf{N} \quad (2.0.6)$$

$$= \|\mathbf{L}\|^2 + \|\mathbf{N}\|^2 - 2.0 \quad (2.0.7)$$

$$= l^2 + 3^2 \quad (2.0.8)$$

$$= l^2 + 9 \quad (2.0.9)$$

But we know $LN=5$

$$SO, \|\mathbf{L} - \mathbf{N}\|^2 = 5^2 = 25 \quad (2.0.10)$$

$$l^2 + 9 = 25 \quad (2.0.11)$$

$$l^2 = 25 - 9 \quad (2.0.12)$$

$$l^2 = 16 \quad (2.0.13)$$

$$l = 4 \quad (2.0.14)$$

$$Therefore, l = 4 \quad (2.0.15)$$

