Assignment-1

G.Soujanya

Download all python codes from

https://github.com/G.Soujanya/AssignmentT−1/tree/main/Assignment%201/CODES

and latex-tikz codes from

https://github.com/G.Soujanya/Assignment−1/tree/main/Assignment%201

1 QUESTION NO-2.13

Construct $\triangle ABC$ such that AB=2.5, BC=6, and AC=6.5.Find$\angle B$

2 SOLUTION

Let us assume, sideAB=c,side BC=a, sideAC=b
Let

$$\mathbf{A} = \begin{pmatrix} 0 \\ 2.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{2.0.1}$$

Now,

$$\|\mathbf{A}-\mathbf{B}\|^2 = \|\mathbf{A}\|^2 = c^2 = (2.5)^2 = 6.25 \tag{2.0.2}$$

$$\|\mathbf{B}-\mathbf{C}\|^2 = \|\mathbf{C}\|^2 = a^2 = (6)^2 = 36 \tag{2.0.3}$$

$$\|\mathbf{A}-\mathbf{C}\|^2 = b^2 = (6.5)^2 = 42.25 \tag{2.0.4}$$

From $\triangle ABC$, we use the Law of cosine:

$$b^2 = a^2 + c^2 - 2ac\cos B \tag{2.0.5}$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac} \tag{2.0.6}$$

$$\cos B = \frac{0}{32.5} \tag{2.0.7}$$

$$\cos B = o \tag{2.0.8}$$

$$\angle B = 90^\circ \tag{2.0.9}$$

As we consider$\triangle ABC$ in first quadrant we consider $\angle B$

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

$$\mathbf{A} = \begin{pmatrix} 0 \\ 2.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{2.0.10}$$

Now, $\triangle ABC$ can be plotted using vertices AB ,BC and AC .
Plot of $\triangle ABC$:

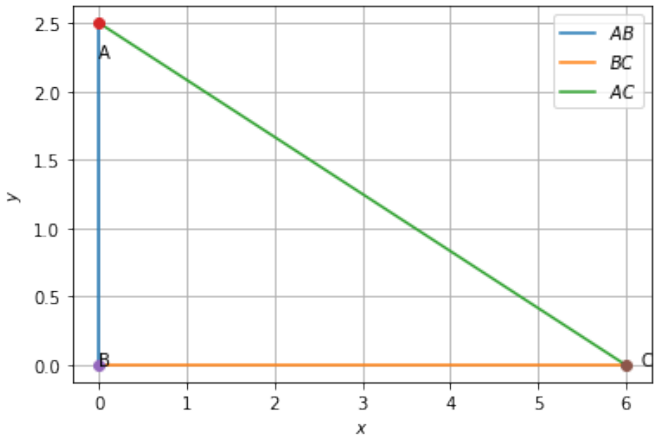

Fig. 2.1: $\triangle ABC$