$\triangle ABC$2.12$\triangle ABC$figure.caption.1

Assignment1

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Download all python codes from

https://github.com/G.soujanya/Assignment1/tree/main/Assignment1%201/CODES

and latex-tikz codes from

https://github.com/G.soujanya/Assignment1/tree/main/Assignmen1t%201

1 QUESTION NO-2.13

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

2 SOLUTION

Let

$$\mathbf{A} = \begin{pmatrix} 0 \\ 6.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 2.5 \\ 0 \end{pmatrix} \tag{2.0.1}$$

Now,

$$\|\mathbf{A}-\mathbf{B}\|^2 = \|\mathbf{A}\|^2 = 6.5^2 = 42.25 \tag{2.0.2}$$

$$\|\mathbf{B}-\mathbf{C}\|^2 = \|\mathbf{C}\|^2 = 2.5^2 = 6.25 \, \|\mathbf{A}-\mathbf{C}\|^2 = 6^2 = 36 \tag{2.0.3}$$

From $\triangle ABC$,We know,use the Law of cosine

$$= b^2 = a^2 + c^2 - 2accosB \tag{2.0.4}$$

$$= 6^2 = 2.5^2 + 6.5^2 - 2 * 2.5 * 6.5cosB \tag{2.0.5}$$

$$= 36 = 6.25 + 42.25 - 32.5cosB \tag{2.0.6}$$

$$= 36 - 6.25 - 42.25 = 32.5cosB \tag{2.0.7}$$

$$= 12.5 = 32.5cosB \tag{2.0.8}$$

$$= cosB = 12.5/32.5 \tag{2.0.9}$$

$$= \angle B = arccos12.5/32.5 \quad = \angle B = 67.38^\circ \tag{2.0.10}$$

As we consider $\triangle ABC$

$$\therefore angleB = 67.38 \tag{2.0.11}$$

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

$$\mathbf{A} = \begin{pmatrix} 0 \\ 6.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 2.5 \\ 0 \end{pmatrix} \tag{2.0.12}$$

Now, $\triangle ABC$ can be plotted using vertices AB ,BC and AC .
Plot of the $\triangle ABC$ with$\angle$ B=67.38°:

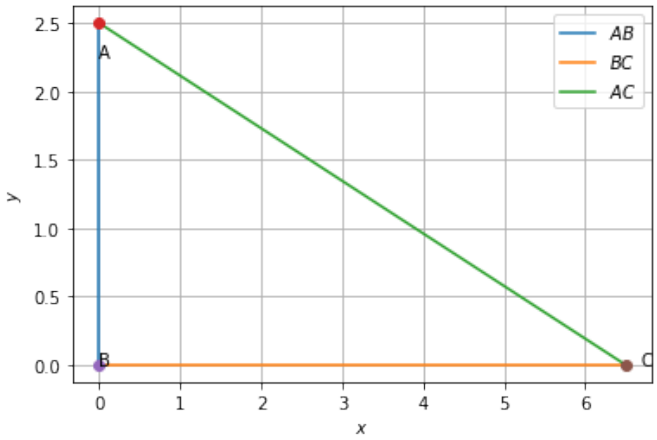

Fig. 2.1: $\triangle ABC$