

Assignment-1

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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>

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

Plot of $\triangle ABC$:

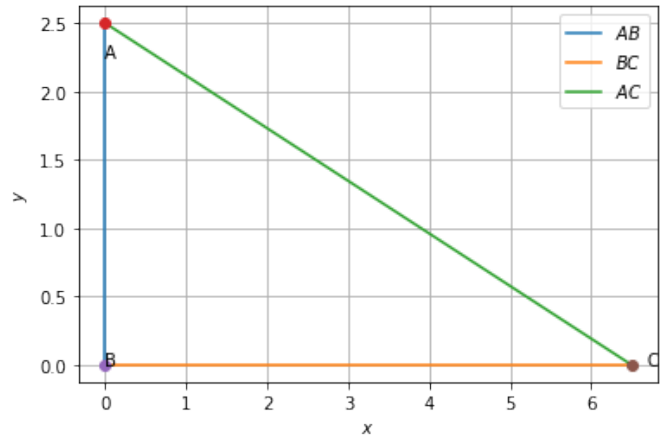


Fig. 2.1: $\triangle ABC$

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, side $AB=c$, side $BC=a$, side $AC=b$
Let

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

Now,

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

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

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

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

$$b^2 = a^2 + c^2 - 2ac \cos B \quad (2.0.5)$$

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

$$\cos B = \frac{0}{32.5} \quad (2.0.7)$$

$$\cos B = 0 \quad (2.0.8)$$

$$B = 90^\circ \quad (2.0.9)$$

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

$$\therefore \text{angle } B = 90 \quad (2.0.10)$$

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

$$\mathbf{A} = \begin{pmatrix} 0 \\ 2.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad (2.0.11)$$