

Assignment 1

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Download all python codes from

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

and latex-tikz codes from

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

The Vertices of $\triangle ABC$ are

$$\mathbf{A} = \begin{pmatrix} 0 \\ c \end{pmatrix} = \begin{pmatrix} 0 \\ 4.64 \end{pmatrix} \quad (2.0.13)$$

$$\mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (2.0.14)$$

$$\mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} = \begin{pmatrix} 4.02 \\ 0 \end{pmatrix} \quad (2.0.15)$$

1 QUESTION No. 2.9

Draw $\triangle ABC$ in which $\angle C = 90^\circ, \angle B = 30^\circ$ and $a + b + c = 11$

2 EXPLANATION

Given,

$$\angle C = 90^\circ, \angle B = 30^\circ, \angle A = 60^\circ \text{ and } a + b + c = 11 \quad (2.0.1)$$

By using Sin Rule:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \quad (2.0.2)$$

$$\Rightarrow b \sin C = c \sin B \quad (2.0.3)$$

$$b \sin 90 = c \sin 30 \quad (2.0.4)$$

$$\Rightarrow c = 2b \quad (2.0.5)$$

$$a \sin B = b \sin A \quad (2.0.6)$$

$$a \sin 30 = b \sin 60 \quad (2.0.7)$$

$$\Rightarrow a = \sqrt{3}b \quad (2.0.8)$$

Then, $\mathbf{AX}=\mathbf{B}$

which can be expressed as the matrix equation

$$\begin{pmatrix} 0 & -2 & 1 \\ 1 & -\sqrt{3} & 0 \\ 1 & 1 & 1 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 11 \end{pmatrix} \quad (2.0.9)$$

By solving (2.0.9), we get values :

$$\Rightarrow a = 4.02627944; \quad (2.0.10)$$

$$\Rightarrow b = 2.32457352; \quad (2.0.11)$$

$$\Rightarrow c = 4.64914704 \quad (2.0.12)$$

Plot the $\triangle ABC$ is as follows:

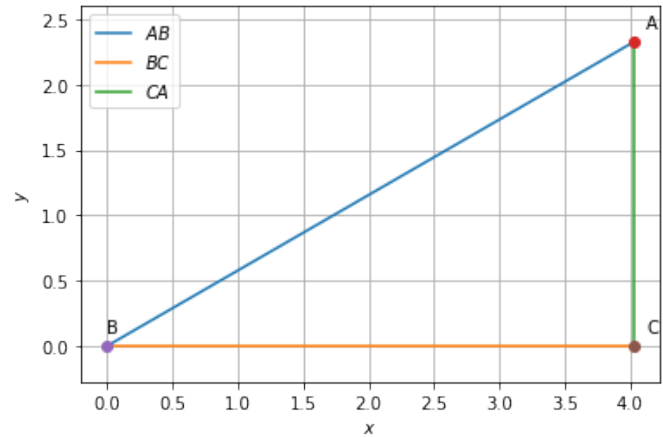


Fig. 2.1: $\triangle ABC$