

# Assignment 1

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Download all python codes from

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

and latex-tikz codes from

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

The Vertices of  $\triangle ABC$  are

$$\mathbf{A} = \begin{pmatrix} 0 \\ c \end{pmatrix} = \begin{pmatrix} 0 \\ 3.22 \end{pmatrix} \quad (2.0.13)$$

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

$$\mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} = \begin{pmatrix} 4.55 \\ 0 \end{pmatrix} \quad (2.0.15)$$

## 1 QUESTION No. 2.3

Draw  $\triangle ABC$  in which  $\angle B = 45^\circ, \angle C = 45^\circ$  and  $a + b + c = 11$

## 2 EXPLANATION

Given,

$$\angle C = 45^\circ, \angle B = 45^\circ, \text{ and } a + b + c = 11 \quad (2.0.1)$$

By using Sin Rule:

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

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

$$b \sin 45 = c \sin 45 \quad (2.0.4)$$

$$\implies b = c \quad (2.0.5)$$

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

$$a \sin 45 = b \sin 90 \quad (2.0.7)$$

$$\implies a = \sqrt{2}b \quad (2.0.8)$$

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

which can be expressed as the matrix equation

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

(2.0.9) by solving, we get values like,

$$\implies a = 4.55634919; \quad (2.0.10)$$

$$\implies b = 3.22182541; \quad (2.0.11)$$

$$\implies c = 3.22182541 \quad (2.0.12)$$

Plot the  $\triangle ABC$  is as follows:

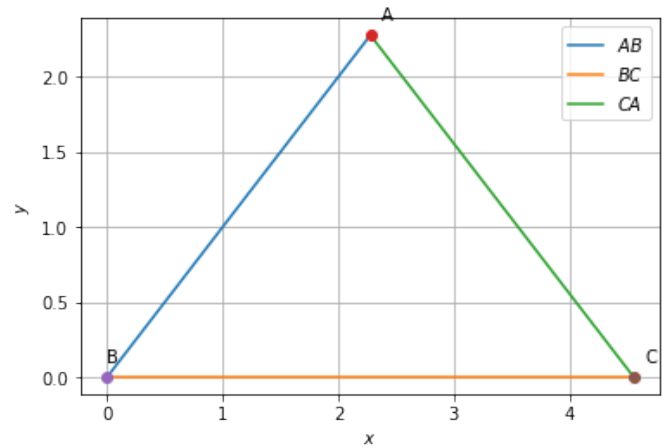


Fig. 0:  $\triangle ABC$