ASSIGNMENT-1

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download all python codes from

https://github.com/Kumarbegnier/IIT−HYD−INTERNSHIP/tree/main/ASSIGNMENT_201/code

latex-tikz codes from

https://github.com/Kumarbegnier/IIT−HYD−INTERNSHIP/blob/main/ASSIGNMENT_201/Latex.tex

1 QUESTION NO-2.19

If $XY = 6, \angle X = 30°$ and $\angle Y = 100°$.Can you draw a triangle?

2 Solution

$$Given, XY = 6 \angle X = 30° \angle Y = 100° \tag{2.0.1}$$

$$Let, XY = z, YZ = x, XZ = y \tag{2.0.2}$$

Angle Sum Property

$$\angle Z° = \angle 180° - \angle X° + \angle Y° \tag{2.0.3}$$

$$\angle Z° = \angle 50° \tag{2.0.4}$$

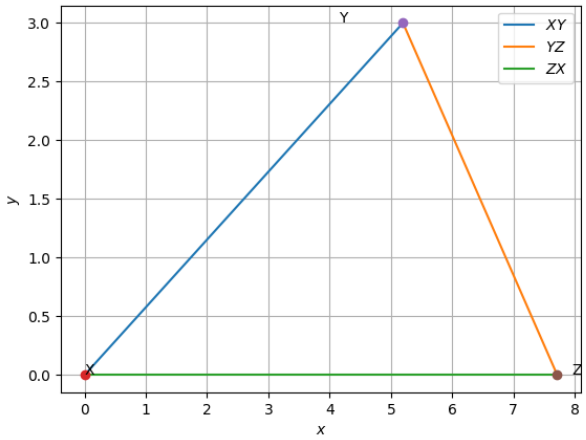

Fig. 0: Constructed Triangle

To find the side y by using the formula

$$\frac{\sin X}{x} = \frac{\sin Y}{y} = \frac{\sin Z}{z} \tag{2.0.5}$$

written as,

$$y = z\left(\frac{\sin Y}{\sin Z}\right) \quad = 6\left(\frac{\sin 100°}{\sin 50°}\right) = 7.7134 \tag{2.0.6}$$

In the $\triangle XYZ$, vertex of Y can be expressed in polar coordinate.

$$\mathbf{X} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Y} = z\begin{pmatrix} \cos X° \\ \sin X° \end{pmatrix}, \mathbf{Z} = \begin{pmatrix} y \\ 0 \end{pmatrix} \tag{2.0.7}$$

$$\mathbf{X} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Y} = 6\begin{pmatrix} \cos 30° \\ \sin 30° \end{pmatrix} = \begin{pmatrix} 3\sqrt{3} \\ 3 \end{pmatrix}, \mathbf{Z} = \begin{pmatrix} 7.7134 \\ 0 \end{pmatrix} \tag{2.0.8}$$

The values of X, Y and Z are substituted and the triangle is plotted as given above.