

Assignment - 1

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Abstract—This is a simple document to learn about vectors, matrices and constructions using latex, draw figures using Python, Latex.

Download all python and latex-tikz codes from

svn co <https://github.com/arjunjc93/Assignment-4>.
git

1 CONSTRUCTIONS USING PYTHON G V V SHARMA

1.1. Construct $\triangle XYZ$ if $XY=6$, $\angle X = 30^\circ$ & $\angle Y = 100^\circ$

Solution: Let x , y & z be the length of sides opposite $\angle X$, $\angle Y$ & $\angle Z$.

Let,

$$\mathbf{X} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Y} = 6 \begin{pmatrix} \cos 30 \\ \sin 30 \end{pmatrix} \text{ \& } \mathbf{Z} = \begin{pmatrix} x \\ 0 \end{pmatrix} \quad (1.1.1)$$

be the vertices of the triangle.

$$\angle Z = 50^\circ$$

By law of sines,

$$\frac{\sin \mathbf{X}}{x} = \frac{\sin \mathbf{Y}}{y} = \frac{\sin \mathbf{Z}}{z} \quad (1.1.2)$$

$$\Rightarrow y = \frac{6 \sin 100}{\sin 50} \quad (1.1.3)$$

$$= 7.71 \quad (1.1.4)$$

$$x = \frac{6 \sin 30}{\sin 50} \quad (1.1.5)$$

$$= 3.9 \quad (1.1.6)$$

And

$$\mathbf{Y} = 6 \begin{pmatrix} \cos 30 \\ \sin 30 \end{pmatrix} \quad (1.1.7)$$

$$= \begin{pmatrix} 5.2 \\ 3 \end{pmatrix} \quad (1.1.8)$$

Thus, the vertices of the $\triangle XYZ$ are

$$\mathbf{X} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Y} = \begin{pmatrix} 5.2 \\ 3 \end{pmatrix}, \mathbf{Z} = \begin{pmatrix} 7.71 \\ 0 \end{pmatrix} \quad (1.1.9)$$

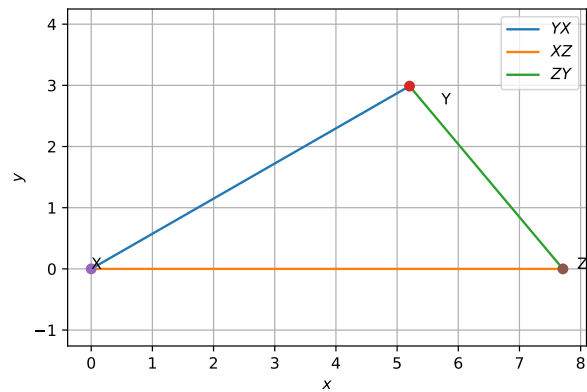


Fig. 1.1. $\triangle XYZ$, $XY=6$, $\angle X = 30^\circ$ & $\angle Y = 100^\circ$