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

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svn co https://github.com/arjunjc93/Assignment-4.git
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1 Constructions using Python

G V V Sharma

Exercise 2.3

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

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

$$\mathbf{X} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Y} = 6\begin{pmatrix} \cos 30 \\ \sin 30 \end{pmatrix} \& \mathbf{Z} = \begin{pmatrix} y \\ 0 \end{pmatrix} \tag{1.1.1}$$

be the vertices of the triangle.

$\angle Z = 50^o$

By law of sines,

$$\frac{\sin \mathbf{X}}{x} = \frac{\sin \mathbf{Y}}{y} = \frac{\sin \mathbf{Z}}{z} \tag{1.1.2}$$

$$\implies y = \frac{6 \sin 100}{\sin 50} \tag{1.1.3}$$

$$= 7.71 \tag{1.1.4}$$

$$x = \frac{6 \sin 30}{\sin 50} \tag{1.1.5}$$

$$= 3.9 \tag{1.1.6}$$

And

$$\mathbf{Y} = 6\begin{pmatrix} \cos 30 \\ \sin 30 \end{pmatrix} \tag{1.1.7}$$

$$= \begin{pmatrix} 5.2 \\ 3 \end{pmatrix} \tag{1.1.8}$$

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

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

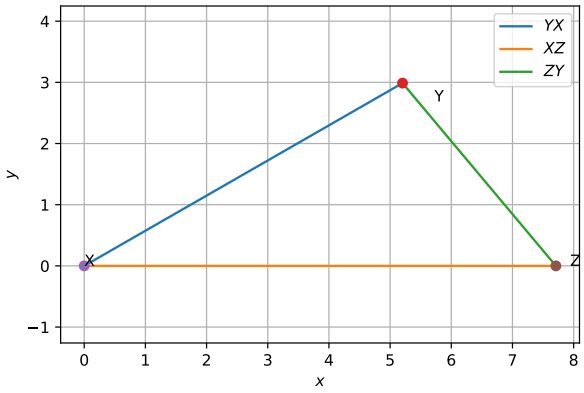

Fig. 1.1. $\triangle XYZ$, XY=6, $= 30^o$ & $\angle Y = 100^o$

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