# Assignment - 1

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MD/2020/702

***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, $= 30^o$ & $\angle Y = 100^o$

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

$$\mathbf{X} = \begin{pmatrix}0\\0\end{pmatrix}, \mathbf{Y} = 6\begin{pmatrix}cos30\\sin30\end{pmatrix} \& \mathbf{Z} = \begin{pmatrix}y\\0\end{pmatrix} \tag{1.1.1}$$

be the vertices of the triangle.

$\angle Z = 50^o$

By law of sines,

$$\frac{sinX}{x} = \frac{sinY}{y} = \frac{sinZ}{z} \tag{1.1.2}$$

$$\implies y = \frac{6sin100}{sin50} \tag{1.1.3}$$

$$= 7.71 \tag{1.1.4}$$

$$x = \frac{6sin30}{sin50} \tag{1.1.5}$$

$$= 3.9 \tag{1.1.6}$$

And

$$\mathbf{Y} = 6\begin{pmatrix}cos30\\sin30\end{pmatrix} \tag{1.1.7}$$

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

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

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

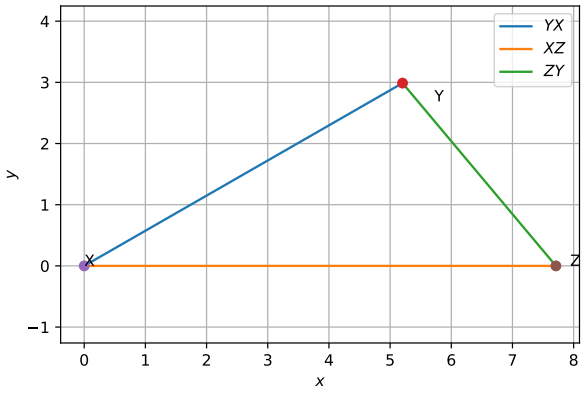


Fig. 1.1. $\triangle XYZ$, XY=6, $= 30^o$ & $\angle Y = 100^o$

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