ASSIGNMENT-1

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1 QUESTION NO-2.21

Construct $\triangle PQR$ such that $PQ = 5, \angle Q = 105°$ and $\angle R = 40°$.

2 Solution

To find angle P:

$$\angle P + \angle Q + \angle R = 180° \tag{2.0.1}$$
$$\angle P = 180° - 145° \tag{2.0.2}$$
$$= 35° \tag{2.0.3}$$

Now we shall find the side p by using the formula

$$\frac{\sin P}{p} = \frac{\sin Q}{q} = \frac{\sin R}{r} \tag{2.0.4}$$

To find side p

$$p = q\left(\frac{\sin R}{\sin Q}\right) \tag{2.0.5}$$
$$= 5\left(\frac{\sin 40°}{\sin 105°}\right) \tag{2.0.6}$$
$$= -3.83867116 \tag{2.0.7}$$

The vertices of $\triangle PQR$ are

$$\mathbf{P} = \begin{pmatrix}0\\0\end{pmatrix}, \mathbf{Q} = p\begin{pmatrix}\cos 35°\\\sin 35°\end{pmatrix}, \mathbf{R} = \begin{pmatrix}5\\0\end{pmatrix} \tag{2.0.8}$$

Lines PQ,QR,RP are then generated and plotted using these coordinates to construct $\triangle PQR$
Plot of the $\triangle PQR$

Triangle_PQR.PNG

Fig. 2.1: Plot of $\triangle PQR$