

# ASSIGNMENT-1

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## 1 QUESTION NO-2.21

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

## 2 SOLUTION

To find angle P:

$$\angle P + \angle Q + \angle R = 180^\circ \quad (2.0.1)$$

$$\angle P = 180^\circ - 145^\circ \quad (2.0.2)$$

$$= 35^\circ \quad (2.0.3)$$

Now we shall find the side  $p$  by using the formula

$$\frac{\sin P}{p} = \frac{\sin Q}{q} = \frac{\sin R}{r} \quad (2.0.4)$$

To find side  $p$

$$p = q \left( \frac{\sin R}{\sin Q} \right) \quad (2.0.5)$$

$$= 5 \left( \frac{\sin 40^\circ}{\sin 105^\circ} \right) \quad (2.0.6)$$

$$= -3.83867116 \quad (2.0.7)$$

The vertices of  $\triangle PQR$  are

$$\mathbf{P} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Q} = p \begin{pmatrix} \cos 35^\circ \\ \sin 35^\circ \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 5 \\ 0 \end{pmatrix} \quad (2.0.8)$$

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

Plot of the  $\triangle PQR$

