Assignment 1

D.Ravalika

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1 QUESTION No. 2.12

Draw $\triangle PQR$ with PQ=4,QR=3.5 and PR=4.what type of triangle is this?

2 SOLUTION

Let

$$\mathbf{P} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} a \\ b \end{pmatrix} \quad (2.0.1)$$

The vertex $\mathbf{R}$ can be expressed in *polar coordinate form* as

$$\mathbf{R} = PR \begin{pmatrix} \cos\theta \\ \sin\theta \end{pmatrix} \quad (2.0.2)$$

where,

$$PR \left(\frac{\sin\theta}{2} \right) = \frac{QR}{2} \quad (2.0.3)$$

$$\theta = 2\sin^{-1}\left(\frac{QR}{2PR} \right) \quad (2.0.4)$$

$$\theta = 2\sin^{-1}\left(\frac{3.5}{8} \right) \quad (2.0.5)$$

$$\theta = 51.88 \quad (2.0.6)$$

$$\mathbf{R} = 4\begin{pmatrix} 0.6173 \\ 0.786 \end{pmatrix} \quad (2.0.7)$$

$$\mathbf{R} = \begin{pmatrix} 2.47 \\ 3.15 \end{pmatrix} \quad (2.0.8)$$

so,the vertices of $\triangle PQR$ are

$$\mathbf{P} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 2.47 \\ 3.15 \end{pmatrix} \quad (2.0.9)$$

Lines *PQ* ,*QR* and *RP* are then generated and plotted using these coordinates to form $\triangle PQR$.Here In $\triangle PQR$ Two sides are equal.So $\triangle PQR$ is a isosceles triangle. Plot of the isosceles $\triangle PQR$:
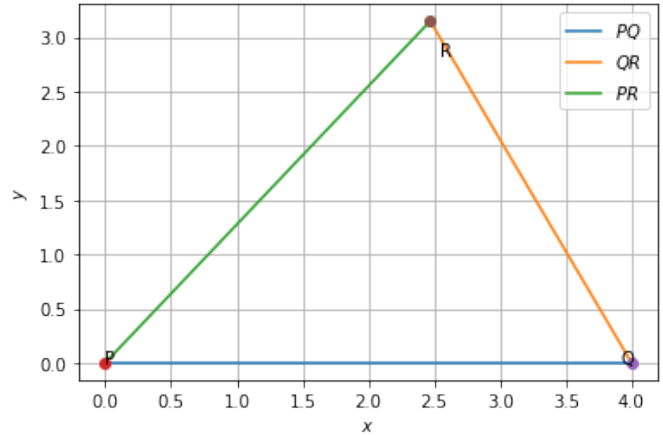

Fig. 2.1: isosceles $\triangle PQR$