Assignment 1

N.Manga

Download all python codes from

https://github.com/N.manga/ASSIGNMNT/Assignment1.py

and latex-tikz codes from

https://github.com/N.manga/ASSIGNMNT/main.tex

1 Question No.2.14

In $\triangle PQR$,$PQ = 3$,=60° and $QR = 5.5$ Sketch PQR

2 SOLUTION

The vertex **P** can be expressed in *polar coordinate form* as $\mathrm{P} = \mathrm{c}\begin{pmatrix}\cos\theta\\ \sin\theta\end{pmatrix}$, $\mathrm{Q} = \begin{pmatrix}0\\0\end{pmatrix}$, $\mathrm{R} = \begin{pmatrix}P\\0\end{pmatrix}$

From $\triangle PQR$,we use the law of cosines:

$$b^2 = a^2 + c^2 - 2ac \tag{2.0.1}$$

$$c^2 - b^2 + a^2 - 2ac = 0 \tag{2.0.2}$$

$$(c+b)(c-b) + 8^2 - 2(8)\left(\frac{1}{\sqrt{2}}\right)c = 0 \quad \left(\because \ angleQ = 60^\circ\right) \tag{2.0.3}$$

$$\frac{7}{2}(c+b) + 64 - 8\sqrt{2}c = 0 \quad (\because QR = 5.5) \tag{2.0.4}$$

$$\implies (7 - 16\sqrt{2})c + 7b = -128 \tag{2.0.5}$$

And we have,

$$\implies QR = 5.5 \tag{2.0.6}$$

$$QR = \frac{7}{2} \tag{2.0.7}$$

which can be expressed as the matrix equation

$$\begin{pmatrix}7 - 16\sqrt{2} & 7\\ 1 & -1\end{pmatrix}\begin{pmatrix}c\\b\end{pmatrix} = \begin{pmatrix}-128\\ \frac{7}{2}\end{pmatrix} \tag{2.0.8}$$

therefore, $\begin{pmatrix}c\\b\end{pmatrix}$=$\begin{pmatrix}11.99\\8.49\end{pmatrix}$

so,the vertices of $\triangle PQR$ are

Plot of the $\triangle PQR$:

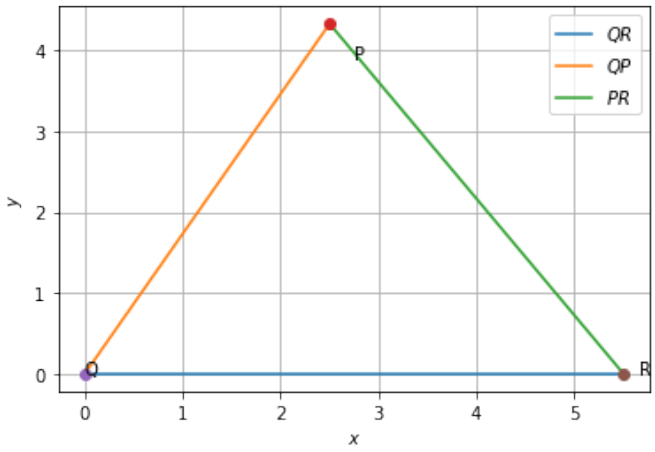

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Fig. 2.1: $\triangle PQR$