

Figure0

Assignment 1

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Download all python codes from

<https://github.com/Ravalika/Matrix-Theory/tree/main/Assignment1/Codes>

and latex-tikz codes from

<https://github.com/Ravalika/Matrix-Theory/tree/main/Assignment1>

1 QUESTION No. 2.12

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

2 SOLUTION

Let us assume that:

$$\mathbf{Q} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{P} = \begin{pmatrix} 0 \\ 4 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 3.5 \\ 0 \end{pmatrix} \quad (2.0.1)$$

Then,

$$\mathbf{PQ} = \|\mathbf{P} - \mathbf{Q}\|^2 = \|\mathbf{P}\|^2 = 4^2 = 16 \quad (\because \mathbf{Q} = 0) \quad (2.0.2)$$

$$\mathbf{QR} = \|\mathbf{R} - \mathbf{Q}\|^2 = \|\mathbf{R}\|^2 = 12.25 \quad (\because \mathbf{Q} = 0) \quad (2.0.3)$$

$$\mathbf{PR} = \|\mathbf{P} - \mathbf{R}\|^2 = 4^2 = 16 \quad (2.0.4)$$

$$(2.0.5)$$

Here

$$\mathbf{PQ} = \mathbf{PR} \quad (2.0.6)$$

Two sides are equal. so $\triangle PQR$ is isosceles right angle triangle.

So, the vertices of $\triangle PQR$ in fig. ?? are:

$$\mathbf{P} = \begin{pmatrix} 0 \\ 4 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 3.5 \\ 0 \end{pmatrix} \quad (2.0.7)$$

Lines PQ , QR and PR are then generated and plotted using these coordinates to form isosceles $\triangle PQR$. Plot of the right angle $\triangle PQR$:

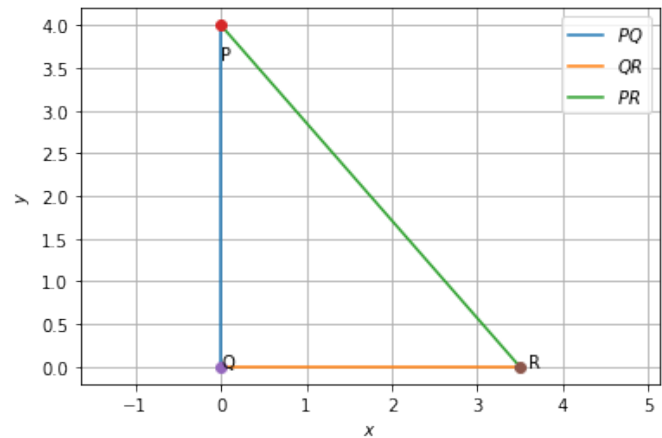


Fig. 2.1: isosceles $\triangle PQR$