

9.10.5.3

Question : In figure 1, $\angle PQR = 100^\circ$, where P, Q and R are points on a circle with centre O . Find $\angle OPR$.

Solution :

Input Parameters	Description	Value
O	Center(at origin)	0
r	Radius	1
θ_1	$\angle PQR$	100°
θ_2	$\angle NOP$	165.4°
θ_3	$\angle NOR$	5°

Table 1: Table of input parameters

Output Parameters	Description	Value
Q	Point	$\begin{pmatrix} \cos \theta_1 \\ \sin \theta_1 \end{pmatrix}$
P	Point	$\begin{pmatrix} \cos \theta_2 \\ \sin \theta_2 \end{pmatrix}$
R	Point	$\begin{pmatrix} \cos \theta_3 \\ \sin \theta_3 \end{pmatrix}$

Table 2: Table of output parameters

For getting the value of the $\angle OPR$

$$\cos \angle OPR = \frac{(\mathbf{O} - \mathbf{P})^\top (\mathbf{R} - \mathbf{P})}{\|\mathbf{O} - \mathbf{P}\| \|\mathbf{R} - \mathbf{P}\|} \quad (1)$$

$$= \sqrt{\frac{1 - \cos(\theta_2 - \theta_3)}{2}} \quad (2)$$

$$\angle OPR = 10^\circ \quad (3)$$

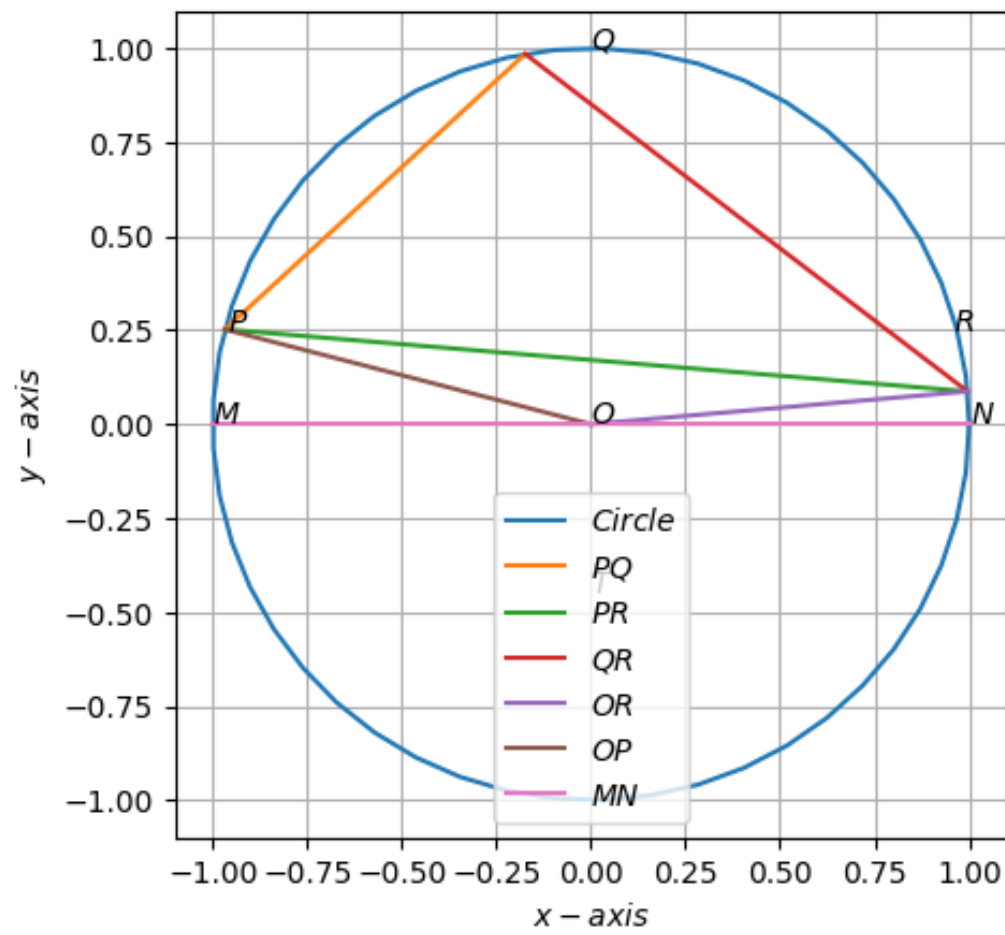


Figure 1: