

### 9.10.5.3

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

**Solution :**

Input Parameters	Description	Value
<b>O</b>	Center(at origin)	<b>0</b>
$r$	Radius	1
$\theta_1$	$\angle PQR$	$100^\circ$
$\theta_2$	$\angle OPQ$	$165.4^\circ$
$\theta_3$	$\angle ORP$	$5^\circ$

Table 1: Table of input parameters

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

Table 2: Table of output parameters

For getting the value of the  $\angle OPR$

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

$$\angle OPR = 10^\circ \quad (2)$$

$$= \sqrt{\frac{1 - \cos(\theta_2 - \theta_3)}{2}} \quad (3)$$

$$(4)$$

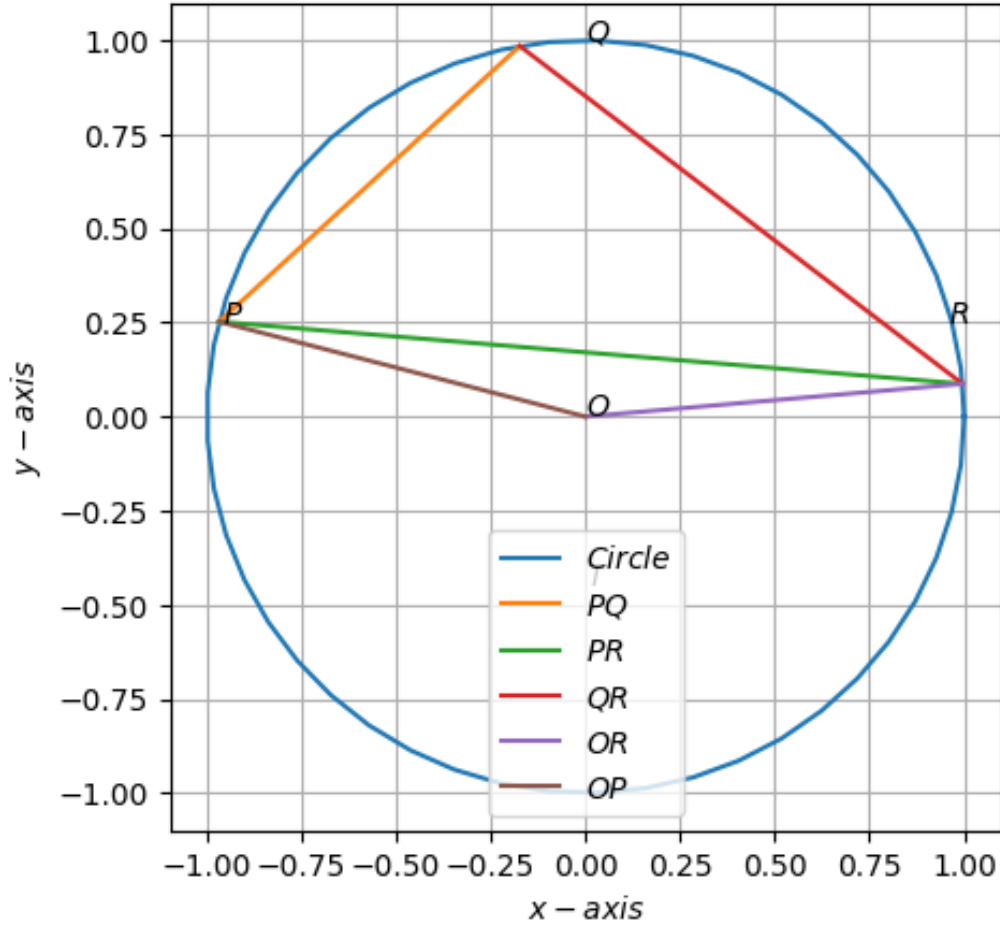


Figure 1: