

# ASSIGNMENT 3

C.RAMYA TULASI

Download all python codes from

<https://github.com/ka-raja-babu/Matrix-Theory/tree/main/Assignment3/Codes>

and latex-tikz codes from

<https://github.com/ka-raja-babu/Matrix-Theory/tree/main/Assignment3>

## 1 QUESTION No 2.56

Construct a tangent to a circle of radius 4 units from a point on concentric circle of radius 6 units.

## 2 SOLUTION

Data from the given question

	Symbols	Circle1	Circle2
Centre	<b>O</b>	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
Radius	$r_1, r_2$	4	6

Let  $PQ$  and  $PR$  be tangents from point P on circle with radius 6 to the point Q and R on circle with radius 4 .

Using the fact that angle between radius and tangent of a circle is 90, From  $\triangle OPQ$

$$\cos \theta = \frac{4}{6} \quad (2.0.1)$$

$$\theta = 48.5 \quad (2.0.2)$$

Angle between PQ and OP =  $180 - (90 + 48.5) = 41.8$

$\therefore$  Angle between OP and OQ is 48.5 and angle between PQ and OP is 41.8

Now ,

$$\mathbf{Q} = 4 \begin{pmatrix} \cos \theta \\ \sin \theta \end{pmatrix} = \begin{pmatrix} 2.64 \\ 2.96 \end{pmatrix} \quad (2.0.3)$$

Similarly, from  $\triangle OPR$

$$\mathbf{R} = \begin{pmatrix} 2.64 \\ -2.96 \end{pmatrix} \quad (2.0.4)$$

Now, vertices of  $\triangle OPQ$  and  $\triangle OPR$ :

$$\mathbf{O} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{P} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 2.64 \\ 2.96 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 2.64 \\ -2.96 \end{pmatrix} \quad (2.0.5)$$

Plot of Tangent PQ and PR :

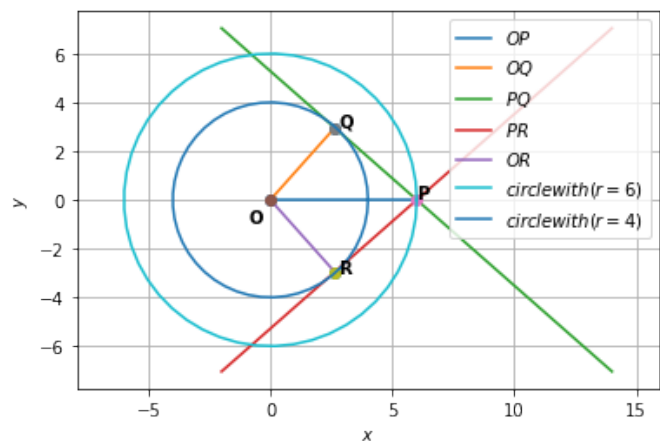


Fig. 2.1: Tangents to a circle of radius 4 units from a point on concentric circle of radius 6 units