ASSIGNMENT 3

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Download all python codes from

https://github.com/CRAMYATULASI/ASSIGNMENT_3/tree/main/ASSIGNMENT3/CODES

and latex-tikz codes from

https://github.com/CRAMYATULASI/ASSIGNMENT_3/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	**O**	$\begin{pmatrix}0\\0\end{pmatrix}$	$\begin{pmatrix}0\\0\end{pmatrix}$
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 $\triangle OPQ$

$$\cos\theta = \frac{4}{6} \tag{2.0.1}$$

$$\theta = 48.5^\circ \tag{2.0.2}$$

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

∴ Angle between OP and OQ is 48.5°and angle between PQ and OP is 41.8°

Now ,

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

Similarly,from $\triangle OPR$,

$$\mathbf{R} = \begin{pmatrix}2.64\\-2.96\end{pmatrix} \tag{2.0.4}$$

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

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

Plot of Tangents PQ and PR :

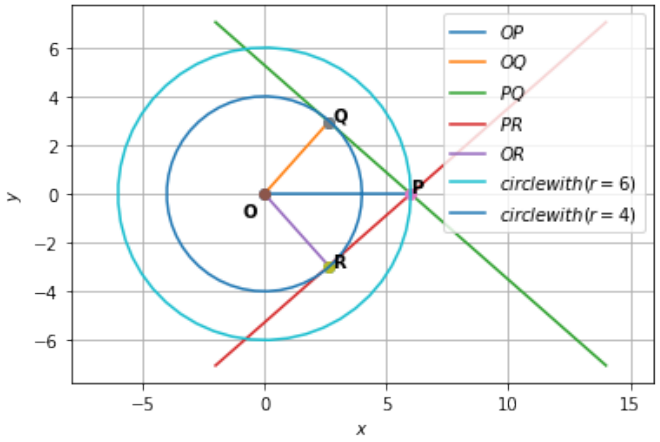

Fig. 2.1: Tangents to a circle of radius 4 units from a point on concentric circle of radius 6 units.