ASSIGNMENT 3

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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	$\mathbf{O}$	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
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 $\triangle OPQ$

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

$$\theta = 48.5° \qquad (2.0.2)$$

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 ,

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

Similarly,from $\triangle OPR$,

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

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

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

$$(2.0.5)$$

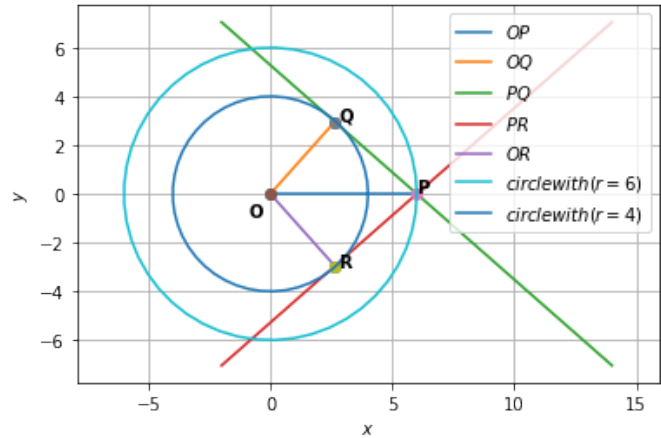Plot of Tangents PQ and PR :

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