ICSE 10,2019

AI21BTECH11016

I. PROBLEM 4-C

1) Draw a circle of radius $4cm$. Take a point P outside the circle at a distance of $7cm$ from the centre of the circle and construct a pair of tangents to the circle from that point.
Measure and write down the length of any one tangent.

Solution: The input parameters for this construction are available in TABLE 1.1.

Symbol	Value	Description
r	4	$Radius$
d	7	Distance of **P** from the origin
$sin\theta$	$\frac{r}{d}$	Angle between the tangent from **P** and d
P	**0**	Origin
O	$\begin{pmatrix} d \\ 0 \end{pmatrix}$	Center of circle
$\mathbf{Q}_i$	$r\cot\theta \begin{pmatrix} \cos\theta \\ \pm\sin\theta \end{pmatrix}$	Points of Contact

TABLE 1.1

2) Generating the figure using Python.

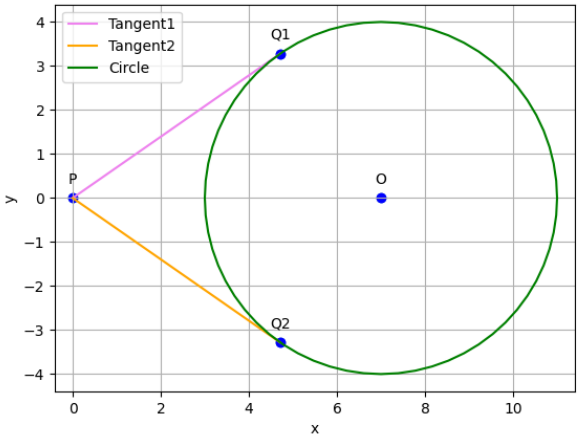

Fig. 2.1.

Given:

$$OP = 7 \tag{2.1}$$

$$OQ2 = 4 \tag{2.2}$$

3) Consider $\triangle OQ2P$,
$\angle OQ2P$ = $\Pi/2$,
$\Rightarrow$From Pythogorean Theorem,

$$OP^2 = OQ2^2 + PQ2^2 \tag{3.1}$$

4) From equations 2.1, 2.2 and 3.1
$\Rightarrow (7)^2 = (4)^2 + PQ2^2$
$\Rightarrow$ PQ$2^2 = 33$
$\Rightarrow$ $PQ2$ = $\sqrt{33}$.

$\therefore$ **The length of tangent drawn from P onto the Circle is $\sqrt{33}$.**