ICSE 10,2019

AI21BTECH11016

1 PROBLEM 4-C

1.1. 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 1.1.1.

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

TABLE 1.1.1

1.2. Generating the figure using Python.

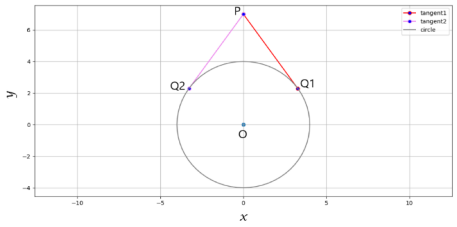

Fig. 1.2.1.

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

$\Rightarrow OP^2 = OQ2^2 + PQ2^2$
OP = 7 and OQ2 = 4
$\Rightarrow$PQ2 = $\sqrt{33}$

Therefore, the length of tangent from P is $\sqrt{33}$