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## MATHS

## NCERT - NCERT MATHEMATICS

## (Bengali)

## TANGENTS AND SECANTS TO A CIRCLE

Example

1. Find the length of the tanget to a circle with
centre ' O ' and radius $=6 \mathrm{~cm}$ from a point P
such that $O P=10 \mathrm{~cm}$.

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2. Draw a pair of tangents to a circle of radius

5 cm which are inclined to each other at an angle $60^{\circ}$.

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3. Draw a circle with radius 4.2 cm and draw a tangent at one side of the diameter .
4. Construct a tangent to a circle of radius 3.7 cm at any point .

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5. Construct a tangent to a circle of radius
4.1 cm at any point .
6. Fill in the blanks
(i) A tangent to a circle touches it in ...... Point (s).
(ii) A line intersecting a circle in two points is called a
(iii) Number of tangents can be drawn to a circle parallel to the given tangent is
(iv) The common point of a Tangent to a circle and the circle is called
(v) We can draw ..... tangents to a given circle.
(vi) A circle can have ..... parallel tangents at the most.

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## 2. Fill in the blanks

A tangent PQ at a point $P$ of a circle of radius
5 cm meets a line through the centre O at a point Q so that $O Q=13 \mathrm{~cm}$. Find length of PQ.
3. Draw a circle with radius 3.3 cm and draw a tangent at one side of the diameter .

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4. Fill in the blanks

Calculate the length of tangent from a point

15 cm away from the centre of a circle of radius 9 cm .

## 5. Fill in the blanks

Prove that the tangents to a circle at the end points of a diameter are parallel.

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Exercise 92

1. Choose the correct answer and give justification for each.
(i) The angle between a tangent to a circle and the radius at the point of contact is
A. $60^{\circ}$
B. $30^{\circ}$
C. $45^{\circ}$
D. $90^{\circ}$

## Answer: D

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2. Choose the correct answer and give justification for each.
(ii) From a point Q , the length of the tangent
to a circle is 24 cm . and the distance of Q from
the centre is 25 cm . The radius of the circle is
A. 7 cm
B. 12 cm
C. 15 cm
D. 24.5 cm

Answer: A
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3. Choose the correct answer and give justification for each.

If $A P$ and $A Q$ are the two tangents a circle with centre O so that $\angle P O Q=110^{\circ}$, then $\angle P A Q$
is equal to

A. $60^{\circ}$
B. $70^{\circ}$
C. $80^{\circ}$
D. $90^{\circ}$

## Answer: B

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4. Choose the correct answer and give
justification for each.
If tangents $P A$ and $P B$ from a point $P$ to a circle with centre O are inclined to each other at angle of $80^{\circ}$, then $\angle P O A$ is equal to
A. $50^{\circ}$
B. $60^{\circ}$
C. $70^{\circ}$
D. $80^{\circ}$

Answer: A

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5. Choose the correct answer and give justification for each.

In the figure $X Y$ and $X^{1} Y^{1}$ are two parallel
tangents to a circle with centre O and another tangent $A B$ with point of contact $C$ intersecting $X Y$ at $A$ and $X^{1} Y^{1}$ at $B$ then
$\angle A O B=$

A. $80^{\circ}$
B. $100^{\circ}$
C. $90^{\circ}$
D. $60^{\circ}$

## Answer: C

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6. Two concentric circles of radii 5 cm and 3 cm are drawn. Find the length of the chord of the
larger circle which touches the smaller circle.
7. Prove that the parallelogram circumscibing a circle is a rhombus.

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8. A triangle $A B C$ is drawn to circumscribe a circle of radius 3 cm such that the segments $B D$ and $D C$ into which $B C$ is divided by the point of contact $D$ are of length 9 cm . And 3 cm . Respectively (See adjacent figure ). Find the
sides $A B$ and $A C$.


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9. Draw a circle of radius 6 cm . From a point

10 cm away its centre, construct the pair of tangents to the circle .

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10. Construct a tangent to a circle of radius 4 cm at any point.

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11. Draw a circle with the help of a compass.

Take a point outside the circle. Construct the pair of tangents from this point to the circle .
12. In a right triangle $A B C$, a circle with a side.
$A B$ as diameter is drawn to intersect the hypotenuse AC in P. Prove that the tangent to the circle at $P$ bisects the side $B C$.

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13. Draw a circle with radius 4 cm and draw a tangent at any point on the circle.
14. Fill the blank: Atmost tangent can drawn from any point on the circle.

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2. In a circle of radius 12 cm , a chord subtends
an angle of $120^{\circ}$ at the centre. Find the area
of the corresponding minor segment of the
circle (use $\pi=3.14$ and $\sqrt{3}=1.732$ )
3. A car has two wipers which do not ovarlap.

Each wiper has a blade of length 25 cm sweeping through an angle of $115^{\circ}$. Find the total area cleaned at each sweep of the blades.
$\left(u s e \pi=\frac{22}{7}\right)$

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4. Find the area of the shaded region in the adjacent figure, where ABCD is a square of side

10 cm and semicircles are drawn with each side
of the square as diameter $(u s e \pi=3.14)$


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5. Find the area of the shaded region in figure,
if $A B C D$ is a square of side 7 cm . And APD and

BPC are semicircles. $\left(u s e \pi=\frac{22}{7}\right)$

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6. In the figure, $O A C B$ is a quadrant of a circle with centre O and radius 3.5 cm . If
$O D=2 c m$, find the area of the shaded
region. $\left(u s e \pi=\frac{22}{7}\right)$


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7. $A B$ and $C D$ are respectively arcs to two concentric circles of radii 21 cm and 7 cm with centre O ( See figure), If $\angle A O B=30^{\circ}$, find
the area of the shaded region. $\left(u s e \pi=\frac{22}{7}\right)$


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8. Calculate the area of the designed region in figure, common between the two quadrants of
$(u s e \pi=3.14)$


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## Optional Exercise

1. Prove that the angle between the two
tangents drawn from an external point to a
circle is supplementary to the angle
subtended by the line - segment joining the points of contact at the centre.

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2. PQ is a chord of length 8 cm of a circle of radius 5 cm . The tangents at P and Q intersect at a point $T$ ( See figure). Find the length of TP.

3. Draw a circle with radius 2.8 cm and draw a tangent at any point on the circle.

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4. Construct a tangent to a circle of radius
3.7 cm at any point .

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5. Draw a circle with radius 2 cm in length. Take point apart from the centre 5 cm in length.

Draw One tangent to the circle from this external point.

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6. Find the area of the shaded region in the figure, in which two circles with centres A and B touch each other at the point $C$, where
$A C=8 \mathrm{~cm}$ and $A B=3 \mathrm{~cm}$


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7.

ABCD is a rectangle with $A B=14 \mathrm{~cm}$ and
$B C=7 \mathrm{~cm} . \quad$ Taking $\mathrm{DC}, \mathrm{BC}$ and AD as diameters, three semicircles are drawn as shown in the figure. Find the area of shaded region.

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## What We Have Discussed

1. A Tangent to a circle is a line which touches
the circle at only one point.
2. Show that, The tangent at any point of a circle is perpendicular to the radius through the point of contact.

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3. The lengths of the two tangents from an external point to a circle are equal.

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4. Draw a circle with radius 2.2 and draw a tangent at one side of the diameter .

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5. Draw a circle with radius 2.6 and draw a tangent at one side of the diameter .

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6. Area of segment of a circle = Area of the
corresponding triangle.

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## Do This

1. Draw a circle with radius 2.7 cm and draw a tangent at any point on the circle .

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## 2. How many tangents can you draw to a circle

from a point away from it ?


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3. In the adjacent figure, which lines are tangents to the circle ?


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4. Draw a circle with radius 3.1 cm and draw a tangent at any point on the circle .

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5. Shankar made the following pictures also.


What shapes can they be broken into, of which we can find area easily?

Make some more pictures and think of the shapes they can be divided into different parts.

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6. Find the area of sector, whose radius is 7 cm . with the given angle :
i. $60^{\circ}$ ii. $30^{\circ}$ iii. $72^{\circ}$ iv. $90^{\circ}$ v. $120^{\circ}$

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7. The length of the minute hand of a clock is

14 cm . Find the area swept by the minute hand in 10 minutes.

1. Draw a circle with radius 3.5 cm and draw a tangent at any point on the circle.

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2. Draw a circle with radius 3 cm in length. Take
point apart from the centre 7 cm in length.

Draw One tangent to the circle from this external point.
3. True or False: Only one tangent can be draw on a circle.
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4. Draw a circle with radius 2.5 cm and draw a tangent at any point on the circle.

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5. How can you find the area of a major segment using area of the corresponding minor segment ?

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