MATHS

NCERT - NCERT Maths(KANNADA)

TANGENTS AND SECANTS TO A CIRCLE

Example

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

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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 of 60°.

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3. Find the area of the segment AYB shown in the adjacent figure. It is given that the radius of the circle is 21 cm and

$\angle AOB = 120^0 \left(Use \pi = \frac{22}{7} \right.$ and $\sqrt{3} = 1.732)$

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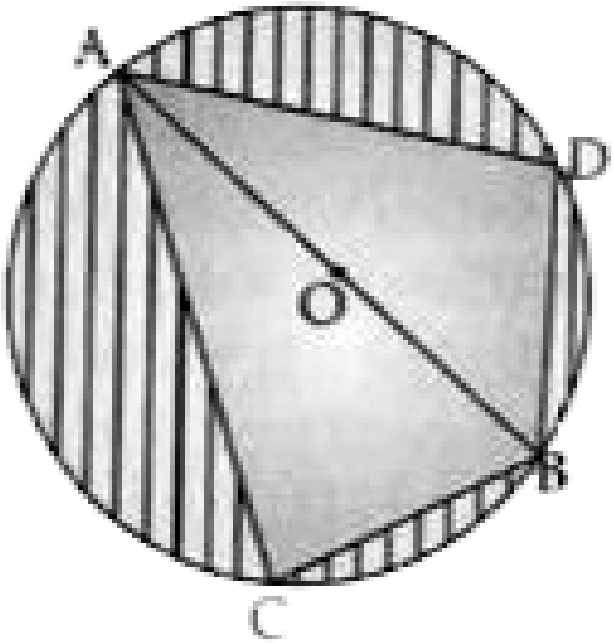
4. Find the area of the shaded region in figure, if BC BD=8cm, AC = AD = 15 cm and O is the

centre of the circle. $(\text{Take } \pi = 3.14)$



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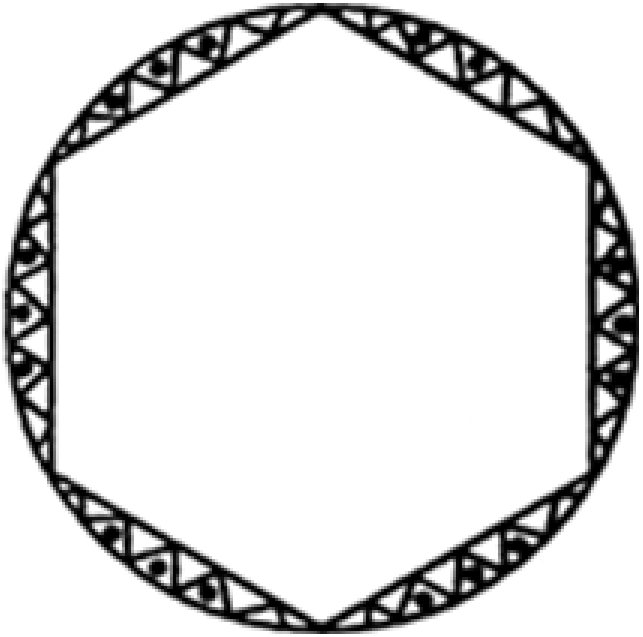
5. A round table top has six equal designs as shown in the figure. If the radius of the table

top is $14cm$, find the cost of making the designs with paint at the rate of $rs5$ per cm^2 (use $\sqrt{3} = 1.732$)



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Exercise 9 1

1. 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. A tangent PQ at a point P on a circle of radius 5 cm meets a line through the centre O at a point Q so that $OQ = 13$ cm. Find PQ.

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3. Fill in the blanks

Draw a circle and two lines parallel to a given

line drawn outside the circle such that one is a tangent and the other, a secant to the circle.

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4. Fill in the blanks

Calculate the length of tangent from a point $15cm$ away from the centre of a circle of radius $9cm$.

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

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Exercise 9 2

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°

B. 30°

C. 45°

D. 90°

Answer: D

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2. 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. $7cm$

B. $12cm$

C. $15cm$

D. $24.5cm$

Answer: A

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

If tangents PA and PB from a point P to a circle

with centre O are inclined to each other at angle of 80°, then $\angle POA$ is equal to

A. 50°

B. 60°

C. 70°

D. 80°

Answer: A

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4. Two concentric circles of radii $5cm$ and $3cm$ are drawn. Find the length of the chord of the larger circle which touches the smaller circle.

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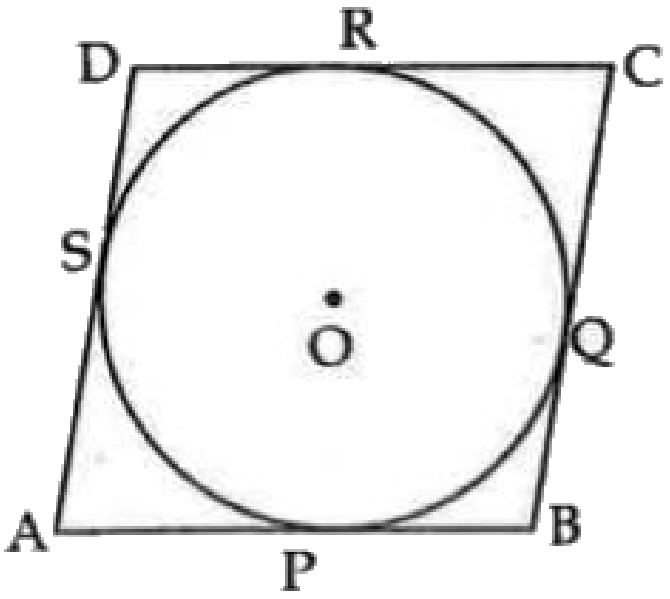
5. Prove that the parallelogram circumscribing a circle is a rhombus.



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6. Draw a circle of radius $6cm$. From a point $10cm$ away its centre, construct the pair of tangents to the circle and measure their lengths. Verify by using Pythogoras Theorem.

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7. Construct a tangent to a circle of radius $4cm$ from a point on the concentric circle of radius $6cm$ and measure its lengths. Also Verify the measurement by actual calculation.

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8. Draw a circle with the help of a bangle. Take a point outside the circle. Construct the pair

of tangents from this point to the circle and measure them. Write your conclusion.

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9. In a right triangle ABC, a circle with a side. AB as diameter is drawn to intersect the hypotenuse AC in P. Prove that the tangent to the circle at P bisects the side BC.

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Exercise 9 3

1. A chord of a circle of radius 10cm subtends a right angle at the centre. Find the area of the corresponding.

(a) minor segment (b) major segment

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2. In a circle of radius $12cm$, a chord subtends an angle of 120° at the centre. Find the area

of the corresponding minor segment of the circle (use $\pi = 3.14$ and $\sqrt{3} = 1.732$)

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3. An car has two wippers do not overlap. Each wiper has a blade of length 25 cm sweeping through an angle of 115°. Find the total area cleaned at each sweep of the blades.

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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. Prove that opposites of a quadrilateral circumscribing a circle subtend supplementary

angles at the centre of the circle.

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3. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

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4. Let ABC be a right triangle in which $AB = 6cm$, $BC = 8cm$ and $\angle B = 90^\circ$. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.

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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.

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2. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

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3. Prove that "the lengths of tangents drawn from an external points to a circle are equal ".

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4. A secant is a line which intersects the circle at two distinct points and the line segment between the points is a chord.

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5. Is the following statement is true. What is your answer?

Area of segment of a circle = Area of the corresponding sector- Area of the corresponding triangle.

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Do This

1. Find the area of sector, whose radius is 7 cm. with the given angle :

i. 60° ii. 30° iii. 72° iv. 90° v. 120°

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2. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 10 minutes.

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Try This

1. How can you prove the converse of the above theorem.

" If a line in the plane of a circle is perpendicular to the radius at its endpoint on the circle, then the line is tangent of the circle ".

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2. Theorem : If two tangents are drawn to a circle from an external point are equal.

Use Pythagoras theorem to write a proof of the above theorem.

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

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