MATHS

NCERT - NCERT Maths(Tamil)

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 $OP = 10cm$.

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

3. Find the area of the segments shaded in figure, if $PQ = 24cm$, $PR = 7cm$ and QR is the diameter of the circle with centre O (Take $\pi = \dfrac{22}{7}$)

4. 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 $rs5Percm^2$ (use $\sqrt{3} = 1.732$)

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. Fill in the blanks

A tangent PQ at a point P of a circle of radius

$5cm$ meets a line through the centre O at a point Q so that $OQ = 13cm$. Find length of PQ.

3. Fill in the blanks

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

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. Fill in the blanks

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

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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

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. $7cm$

B. $12cm$

C. $15 cm$

D. $24.5 cm$

Answer: A

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3. Find the blanks:

Linear Polynomial	Zero of the polynomial
$x + a$	$-a$
$x - a$	-------------
$ax + b$	-------------
$ax - b$	$\dfrac{b}{a}$

A. $60°$

B. $70°$

C. $80°$

D. $90°$

Answer: B

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4. 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
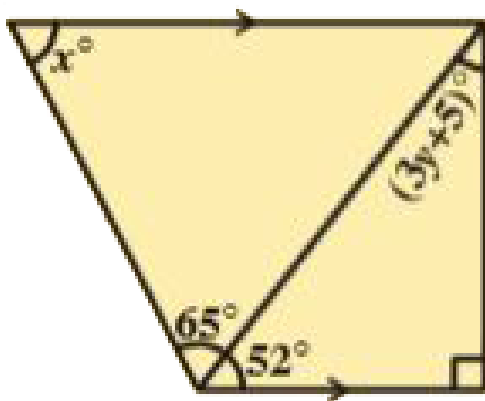
A. $50°$

B. $60°$

C. $70°$

D. $80°$

Answer: A

5. From the figure find x and y.

A. 80°

B. 100°

C. 90°

D. 60°

Answer: C

6. 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.
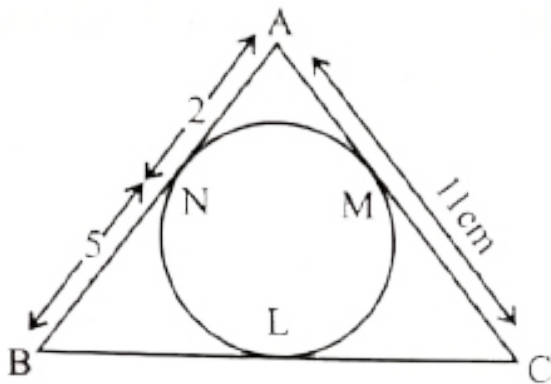
7. Prove that the parallelogram circumscibing a circle is a rhombus.

8. $\triangle ABC$ is circumscribing a circle. Find the length of BC.

9. Find the length of the tangents drawn from C point 10 cm away from a centre of the circle whose radii is 6 cm.

10. 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.

11. In a right angle triangle ABC, right angle is at C, BC+CA = 23 cm and BC-CA = 7cm ,then find sin A tan B

12. Draw a circle with any radius. Draw four tangents at different points. How many more tangets can you draw to this circle ?

1. In a circle of radius $10cm$, a chord subtends a right angle at the centre. Find the area of the corresponding : $(use\pi = 3.14)$

i. Minor segment

ii. Major segment

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2. In a circle of radius $10 cm$, a chord subtends a right angle at the centre. Find the area of the corresponding : $(use \pi = 3.14)$

i. Minor segment

ii. Major segment

3. A car has two wipers which do not ovarlap. Each wiper has a blade of length $25 cm$ sweeping through an angle of $115°$. Find the
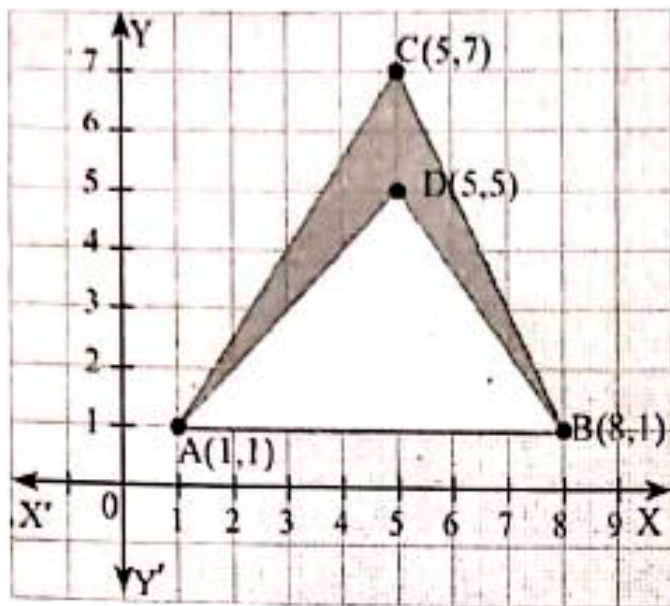
total area cleaned at each sweep of the blades.

$$\left(use \pi = \frac{22}{7} \right)$$

4. Find the area of the shaded region.

5. Find the area of the shaded region in figure, if ABCD is a square of side $7cm$. And APD and BPC are semicircles. $\left(use \pi = \dfrac{22}{7} \right)$

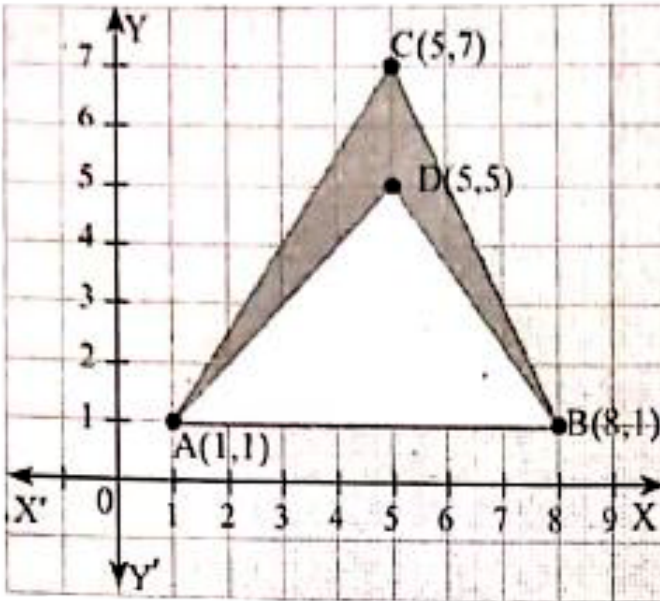**6.** In the figure, OACB is a quadrant of a circle with centre O and radius $3.5cm$. If $OD = 2cm,$ find the area of the shaded

region. $\left(use\pi = \dfrac{22}{7} \right)$

7. Find the area of the shaded region.

8. Calculate the area of the designed region in figure, common between the two quadrants of the circles of radius $10cm$ each. $(use \pi = 3.14)$

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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.

2. PQ is a chord of length $8cm$ of a circle of radius $5cm$. The tangents at P and Q intersect

at a point T (See figure). Find the length of TP.

3. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

4. 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.

5. ABC is a right angled triangle in which $\angle A = 90°$ and $AB = AC$. Show that $\angle B = \angle C$.

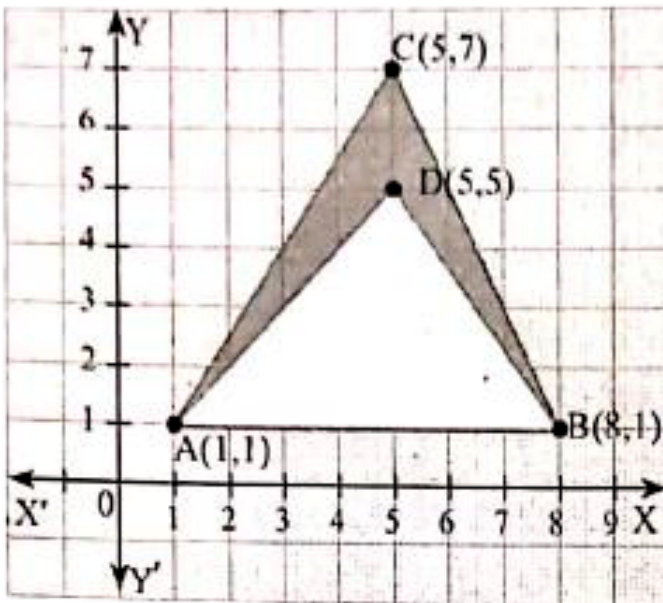**6.** Find the area of the shaded region in the figure, in which two circles with centres A and B touch each other at the point C, where $AC = 8cm$ and $AB = 3cm$

7. Find the area of the shaded region.

What We Have Discussed

1. A Tangent to a circle is a line which touches the circle at only one point.

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

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

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

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

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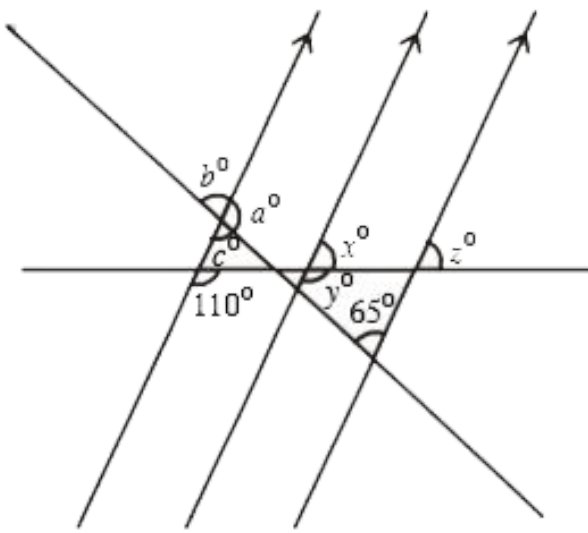**1.** Draw a circle with any radius and then draw two chords equidistant from the centre

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2. How many tangents can you draw to a circle from a point away from it ?

3. In the adjacent figure, find the value of x, y, z and a, b, c.

4. Draw a circle and a secant PQ to the circle on a paper as shown in the figure. Draw various lines parallel to the secant on both

sides of it.

What happens to the length of chord coming closer and closer to the centre of the circle ?

What is the longest chord ?

How many tangents can you draw to a circle, which are parallel to each other ?

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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.

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

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

7. 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. How can you draw the tangent to a circle at a given point when the centre of the circle in not known ?

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3. Find the length of the tangents drawn from C point 10 cm away from a centre of the circle whose radii is 6 cm.

4. Draw a pair of radii OA and OB in a circle such that $\angle BOA = 120°$. Draw the bisector of $\angle BOA$ and draw lines perpendiculars to OA and OB at A and B. These lines meet on the bisector of $\angle BOA$ at a point which is the

external point and the perpendicular lines are the required tangents. Construct and Justify.

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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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