



MATHS

NCERT - NCERT

MATHEMATICS(HINGLISH)

AREAS RELATED TO CIRCLES

Exercise 12 2

1. Tick the correct answer in the following:

Area of a sector of angle p (in degrees) of a

circle with radius R is

(A) $\left(\frac{p}{180}\right) \times 2\pi R$

(B) $\left(\frac{p}{180}\right) \times \pi R^2$

(C) $\left(\frac{p}{360}\right) \times 2\pi R$

(D) $\left(\frac{p}{720}\right) \times 2\pi R^2$



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

(i) minor segment

(ii) major sector.



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3. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:

(i) the length of the arc

(ii) area of the sector formed by the arc

(iii) area of the segment formed by the corresponding chord.



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4. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre . Find the areas of the corresponding minor and major segments of the circle.



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5. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre . Find the area of the corresponding segment of the circle.



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6. Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60° .



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7. Find the area of a quadrant of a circle whose circumference is 22 cm.



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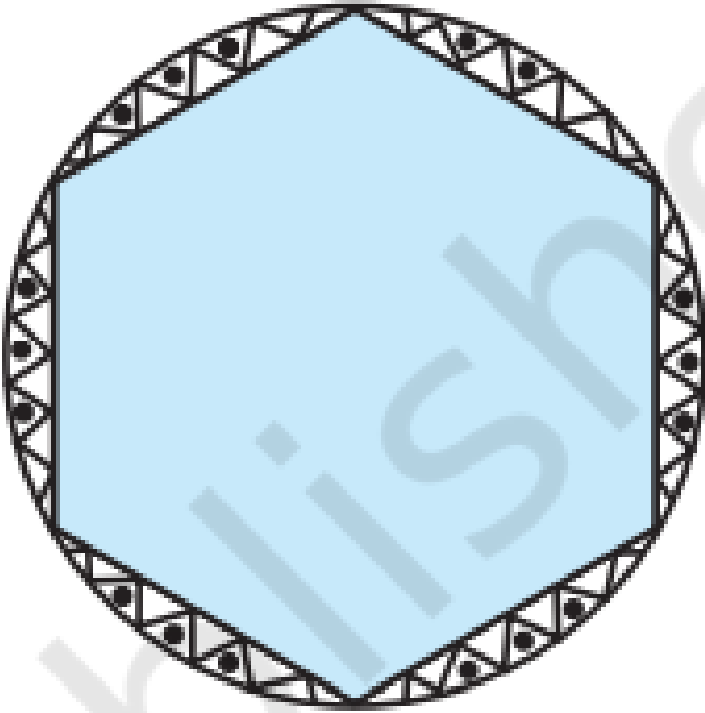
8. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.



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9. A round table cover has six equal designs as shown in Fig. 12.14. If the radius of the cover is 28 cm, find the cost of making the designs at

the rate of $Rs\ 0.35$ per cm^2 .



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10. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (i) the area of that part of the field in which the horse can graze. (ii) the increase in the grazing area if the rope were 10 m long instead of 5 m.



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11. A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire

is also used in making 5 diameters which divide the circle into 10 equal sectors. Find :

- (i) the total length of the silver wire required.
- (ii) the area of each sector of the brooch.



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12. To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned.



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13. A car has two wipers which 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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14. An umbrella has 8 ribs which are equally spaced. Assuming umbrella to be a flat circle

of radius 45 cm, find the area between the two consecutive ribs of the umbrella.

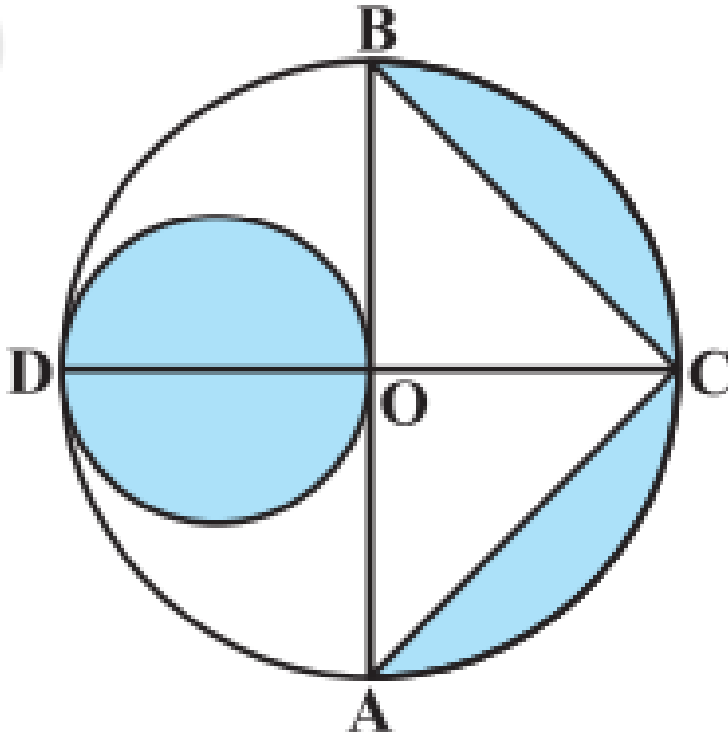


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Exercise 12.3

1. In Fig. 12.27, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If $OA = 7\text{ cm}$, find the area of the

shaded region



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2. Fig. 12.26 depicts a racing track whose left and right ends are semicircular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find :

(i) the distance around the track along its inner edge

(ii) the area of the track.



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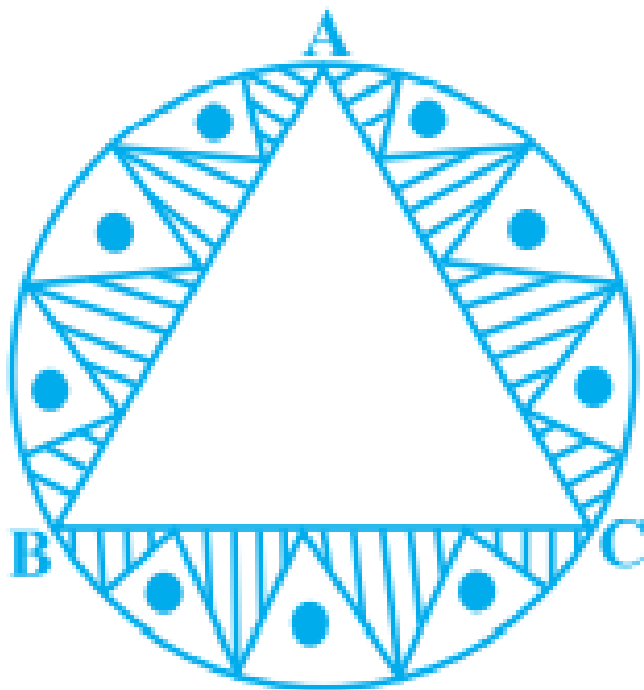
3. In Fig. 12.25, ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of the remaining three circles. Find the area of the shaded region.



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4. In a circular table cover of radius 32 cm, a design is formed leaving an equilateral triangle ABC in the middle as shown in Fig.

12.24. Find the area of the design (shaded region).



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5. Find the area of the shaded region in Fig. 12.22, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre .



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6. Find the area of the shaded region in Fig. 12.21, if ABCD is a square of side 14 cm and APD and BPC are semicircles.



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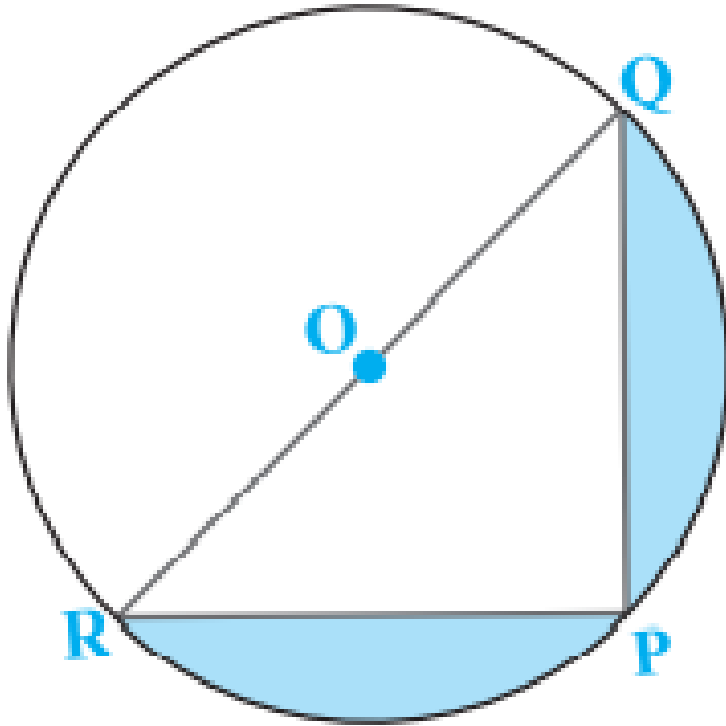
7. Find the area of the shaded region in Fig. 12.20, if radii of the two concentric circles with centre O are 7 cm and 14 cm respectively and $\angle AOC = 40^\circ$



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8. Find the area of the shaded region in Fig. 12.19, if $PQ = 24\text{ cm}$, $PR = 7\text{ cm}$ and O is

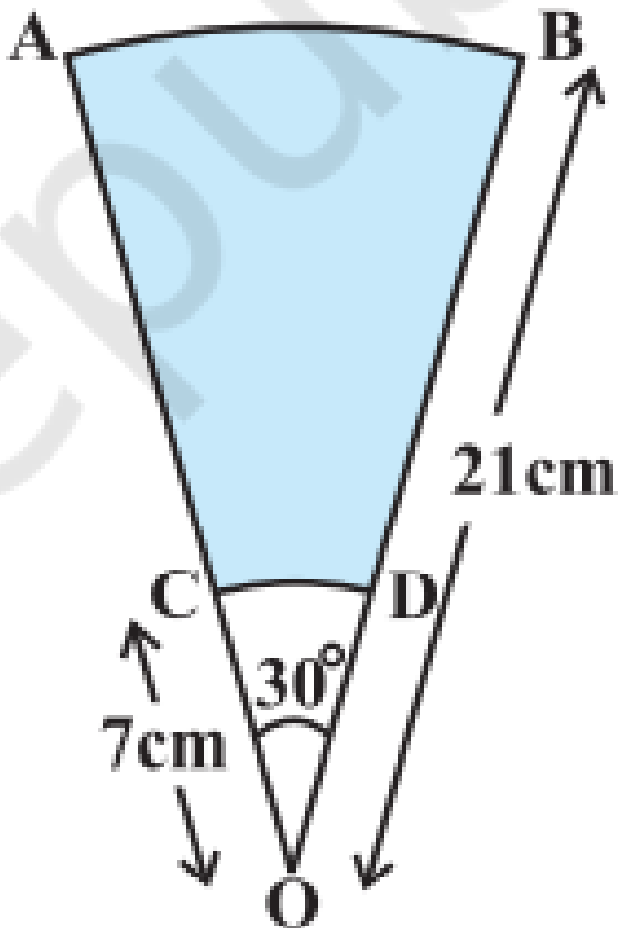
the centre of the circle.



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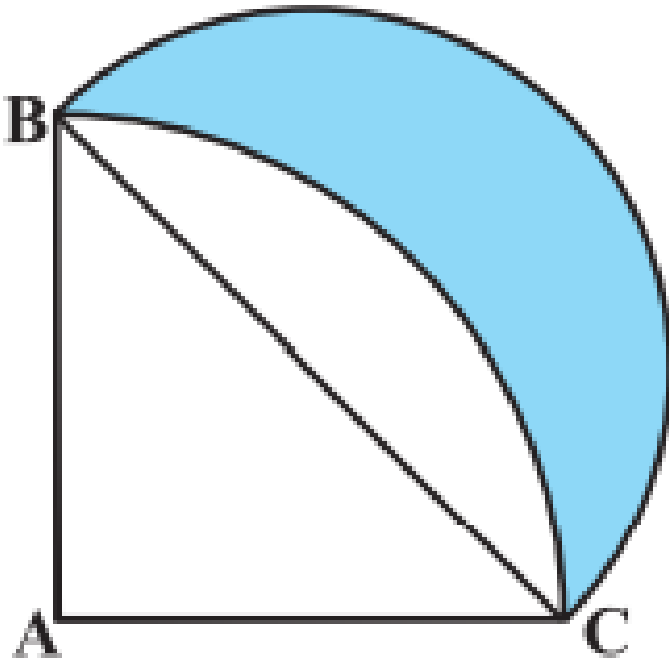
9. AB and CD are respectively arcs of two concentric circles of radii 21 cm and 7 cm and centre O (see Fig. 12.32). If $\angle AOB = 30^\circ$, find

the area of the shaded region.



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10. In Fig. 12.33, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.



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11. Calculate the area of the designed region in Fig. 12.34 common between the two quadrants of circles of radius 8 cm each.



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12. The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle (see

Fig. 12.28). Find the area of the shaded region.

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13. On a square handkerchief, nine circular designs each of radius 7 cm are made (see Fig. 12.29). Find the area of the remaining portion of the handkerchief.



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14. In Fig. 12.30, $OACB$ is a quadrant of a circle with centre O and radius 3.5 cm. If $OD = 2$ cm, find the area of the

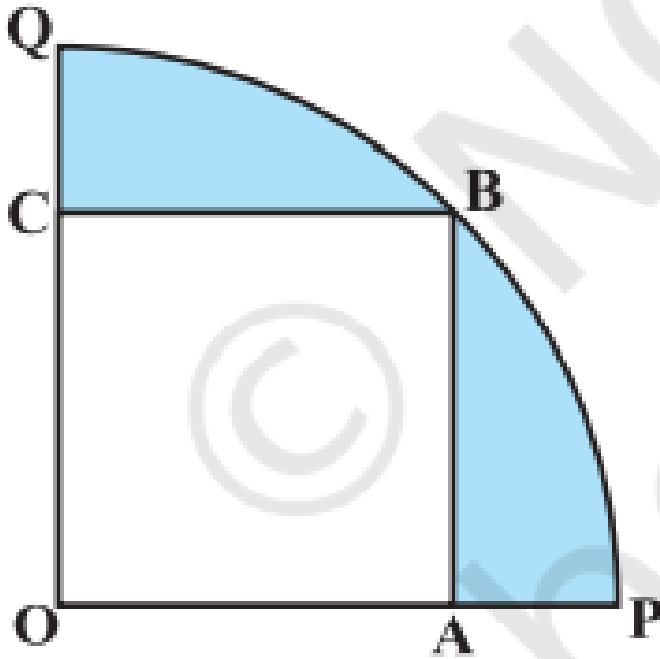
(i) quadrant $OACB$, (ii) shaded region.



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15. In Fig. 12.31, a square $OABC$ is inscribed in a quadrant $OPBQ$. If $OA = 20$ cm, find the area

of the shaded region. (Use $\pi = 3.14$)



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16. From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in Fig. 12.23. Find the area of the remaining portion of the square.



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Exercise 12 1

1. Tick the correct answer in the following and justify your choice : If the perimeter and the area of a circle are numerically equal, then the radius of the circle is (A) 2 units (B) π units (C) 4 units (D) 7 units



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2. The wheels of a car are of diameter 80 cm each. How many complete revolutions does

each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?



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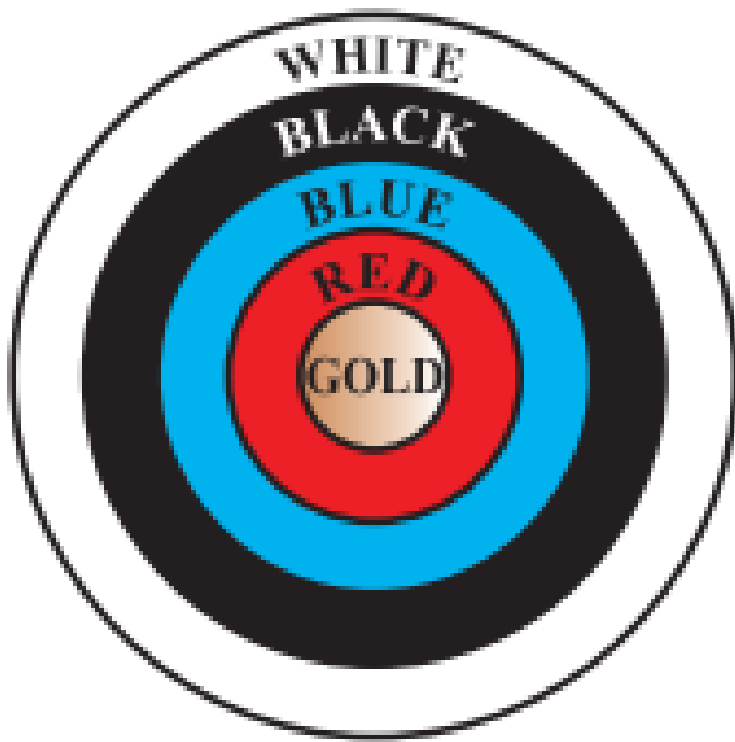
3. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.



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4. Fig. 12.3 depicts an archery target marked with its five scoring areas from the center outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is 21 cm and each of the other bands is 10.5 cm wide. Find the area of each of the five

scoring regions.



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5. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.



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Solved Examples

1. The cost of fencing a circular field at the rate of Rs 24 per metre is Rs 5280. The field is to be

ploughed at the rate of $Rs\ 0.50$ per m^2 . Find the cost of ploughing the field .



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2. Find the area of the shaded design in Fig. 12.17, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter.



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3. There are two circular flower beds on two sides of a square lawn ABCD of side 56 m. If the centre of each circular flower bed is the point of intersection of the diagonals of the square lawn, find the sum of the areas of the lawn and the flower beds.



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4. Find the area of the shaded region in Fig. 12.16, where ABCD is a square of side 14 cm.





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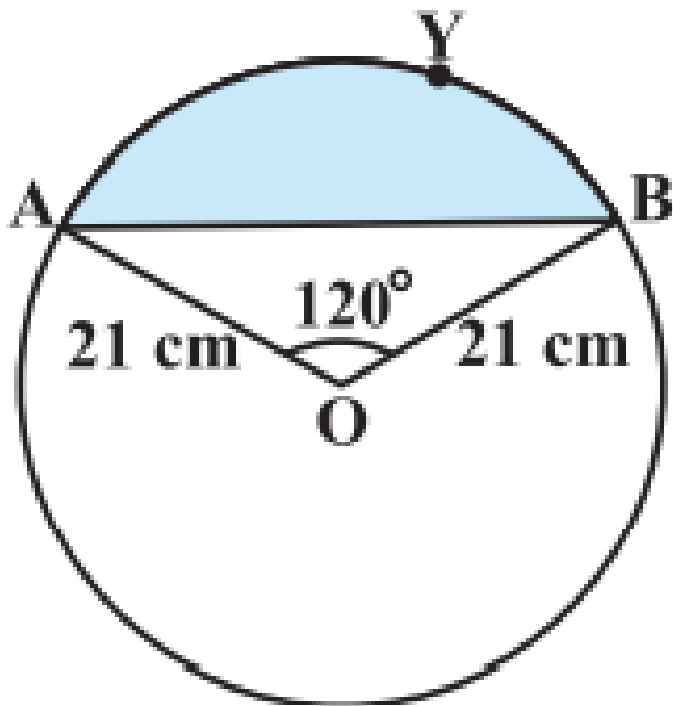
5. Find the area of the sector of a circle with radius 4 cm and of angle 30° . Also, find the area of the corresponding major sector



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6. Find the area of the segment AYB of circle, if radius of the circle centered at O is 21 cm and

$$\angle AOB = 120^\circ$$



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