



# MATHS

## BOOKS - EDUCART PUBLICATION

### AREAS RELATED TO CIRCLES

Objective Type Question Multiple Choice Questions

1. If the perimeter of a semi-circular protractor is 36 cm, then its area is :

A. 90 sq cm

B. 55 sq cm

C. 77 sq cm

D. 65 sq cm

**Answer: C**



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2. The perimeter of a quadrant of a circle of radius 'r' is :

A.  $\frac{\pi r}{2}$

B.  $2\pi r$

C.  $\frac{r}{2}[\pi + 4]$

D.  $2\pi r + \frac{r}{2}$

**Answer: C**



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**3.** The area of a circle, whose radius is 14 cm, is

:

A.  $54 \text{ cm}^2$

B.  $146 \text{ cm}^2$

C.  $40.5 \text{ cm}^2$

D.  $616 \text{ cm}^2$

**Answer: D**



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**4.** If the sum of the areas of two circles with radii  $R_1$  and  $R_2$  is equal to the area of a circle of radius  $R$ , then

A.  $R_1 + R_2 = R$

B.  $R_1^2 + R_2^2 = R^2$

C.  $R_1 + R_2 < R$

D.  $R_1^2 + R_2^2 < R^2$

**Answer: B**



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5. If the sum of the circumferences of two circles with radii  $R_1$  and  $R_2$  is equal to the circumference of a circle of radius  $R$ , then

A.  $R_1 + R_2 = R$

B.  $R_1 + R_2 > R$

C.  $R_1 + R_2 < R$

D. Nothing definite can be said about the relation among  $R_1R_2$  and  $R$ .

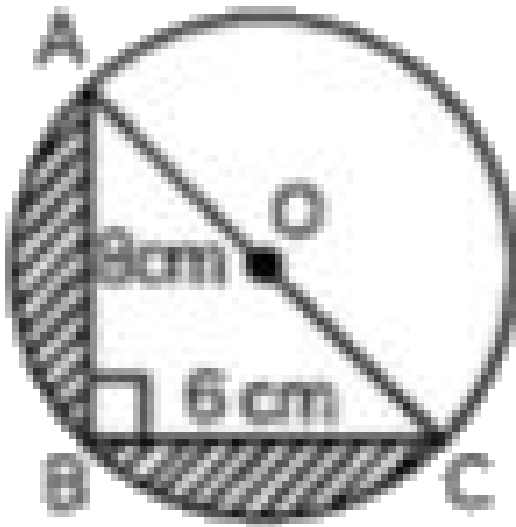
**Answer: A**



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6. In the figure, the area of the shaded portion

is :



A.  $15.25 \text{ cm}^2$

B.  $12.75 \text{ cm}^2$

C.  $18.05 \text{ cm}^2$

D.  $20.60 \text{ cm}^2$

**Answer: A**



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7. It is proposed to build a single circular park equal in area to the sum of areas of two circular parks of diameters 16 m and 12 m in a locality. The radius of the new park would be

A. 10 m



B. 15 m

C. 20 m

D. 24 m

**Answer: A**



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**8.** The radii of two concentric circles are 4 cm and 5 cm. The difference in the areas of these two circles is :

A.  $\pi$

B.  $7\pi$

C.  $9\pi$

D.  $13\pi$

**Answer: C**



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**9.** If the area of a circle is  $154 \text{ cm}^2$ , then its circumference is :

A. 11 cm

B. 22 cm

C. 44 cm

D. 55 cm

**Answer: C**



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**10.** A wire is in the shape of a circle of radius 21 cm. It is bent to form a square. The side of the

square is :  $\left(\pi = \frac{22}{7}\right)$

A. 22 cm

B. 33 cm

C. 44 cm

D. 66 cm

**Answer: B**



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11. The area of a circle that can be inscribed in a square of side 6 cm is :

A.  $36 \pi \text{cm}^2$

B.  $18 \pi \text{cm}^2$

C.  $12 \pi \text{cm}^2$

D.  $9 \pi \text{cm}^2$

**Answer: D**



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12. The outer and inner diameters of a circular ring are 34 cm and 32 cm respectively. The area of the ring is :

A.  $66 \pi \text{cm}^2$

B.  $60 \pi \text{cm}^2$

C.  $33 \pi \text{cm}^2$

D.  $29 \pi \text{cm}^2$

**Answer: C**



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**13.** The diameter of a circle whose area is equal to the sum of the areas of the two circles of radii 24 cm and 7 cm is

A. 31 cm

B. 25 cm

C. 62 cm

D. 50 cm

**Answer: D**



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14. If a circular grass lawn of 35 m in radius has a path 7 m wide running around it on the outside, then the area of the path is

A.  $1450 \text{ m}^2$

B.  $1576 \text{ m}^2$

C.  $1694 \text{ m}^2$

D.  $3368 \text{ m}^2$

**Answer: C**



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15. If a square ABCD is inscribed in a circle of radius 'r' and  $AB = 4$  cm, then the value of r is :

A. 2 cm

B.  $2\sqrt{2}$  cm

C. 4 cm

D.  $4\sqrt{2}$  cm

**Answer: B**



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**16.** The radius of a circle whose circumference is equal to the sum of the circumferences of the two circles of diameters 36 cm and 20 cm is

A. 56 cm

B. 42 cm

C. 28 cm

D. 16 cm

**Answer: C**



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## Objective Type Question Fill In The Blanks

1. What is the ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal?



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2. The radius of a wheel is 0.25 m. The number of revolutions it will make to travel a distance

of 11 km will be (a) 2800 (b) 4000 (c) 5500 (d)  
7000



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3. The area of the circle inscribed in a square of side  $a$  cm is.....



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4. If the circumference and the area of a circle are numerically equal, then diameter of the

circle is (a)  $\frac{\pi}{2}$  (b)  $2\pi$  (c) 2 (d) 4



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5. If the circumference of a circle is 66 cm, then  
is its area is.....



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6. The area of a circle is  $616\text{cm}^2$ . Find its  
circumference



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7. If the area of a semi-circular region is 77 sq m, then its radius is.....



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8. Number of rounds that a wheel of diameter  $\frac{7}{11}$  metre will make in moving a distance of 2 km is.....



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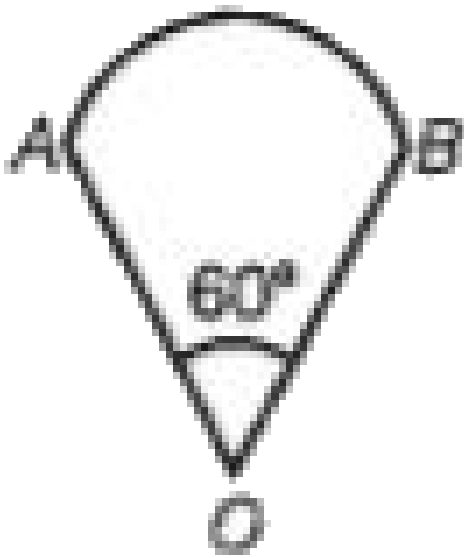
## Objective Type Question Very Short Questions

1. Find the area of the sector of a circle of radius 6 cm whose central angle is  $60^\circ$ . (Take  $\pi = 3.14$ )



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2. The perimeter of the sector of circle of radius 10.5 cm is (Take  $\pi = \frac{22}{7}$ )



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3. Show that if the circumference of two circles are equal, then their areas are also equal.

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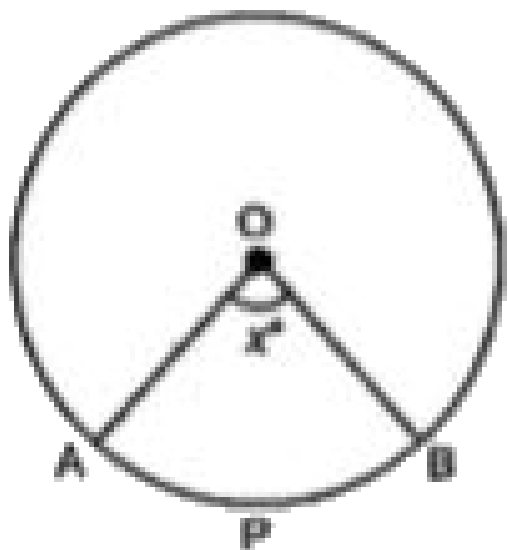
4. The diameter of a cycle wheel is 21 cm. How many revolutions will it make in moving 66 m ?



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5. In given figure, O is the centre of a circle. If the area of the sector OAPB is  $\frac{5}{36}$  times the

area of the circle, then find the value of  $x$ .



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6. Will it be true to say that the perimeter of a square circumscribing a circle of radius  $a$  cm is  $8a$  cm ? Give reason for your answer.



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7. Is it true to say that area of segment of a circle is less than the area of its corresponding sector? Why ?



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8. In covering a distance  $s$  m, a circular wheel of radius  $r$  m makes  $\frac{s}{2\pi r}$  revolution. Is this statement true ? Why ?



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9. Is it true to say that area of square inscribed in a circle of diameter  $p$  cm is  $p^2 \text{ cm}^2$  ? Why ?



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10. Find the area of a sector of a circle of diameter 56 cm and central angle  $45^\circ$  .



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**11.** Find the area of a sector of a circle of radius 7 cm and central angle  $90^\circ$ .



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**12.** In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find the area of sector formed by the arc.



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## Objective Type Question Short Answer Sa I Type Questions

1. The minute hand of a clock is 12 cm long. Find the area swept by it in 35 minutes.



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2. The perimeter of a sector of a circle of radius 5.2cm is 16.4cm. Find the area of the sector.



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3. A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of  $60^\circ$  at its centre. Find the radius of the circle.  $\left[ \text{Use } \pi = \frac{22}{7} \right]$



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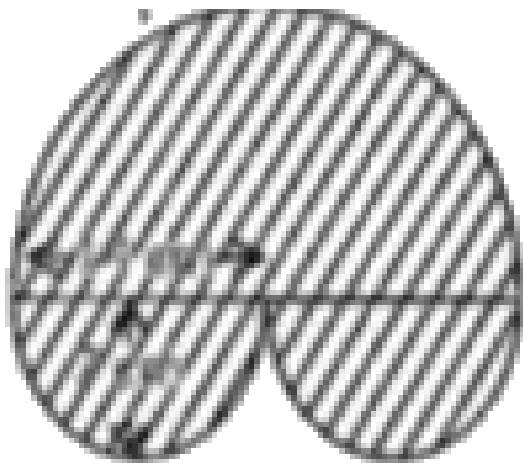
4. The diameter of two circles with centre A and B are 16 cm and 30 cm respectively. If area of another circle with centre C is equal to the

sum of areas of these two circles, then find the circumference of the circle with centre C.



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5. Find the area of the shaded region :



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6. Two circular pieces of equal radii and maximum areas, touching each other are cut out from a rectangular cardboard of dimensions  $14 \text{ cm} \times 7 \text{ cm}$ . Find the area of the remaining cardboard.  $\left( \text{Use } \pi = \frac{22}{7} \right)$



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7. If the length of an arc of a circle of radius  $r$  is equal to that of an arc of a circle of radius

$2r$ , then the angle of the corresponding of the other circle. Is this statement false ? Why ?



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**8.** The areas of two sectors of two different circles are equal. Is it necessary that their corresponding arc lengths are equal ? Why ?



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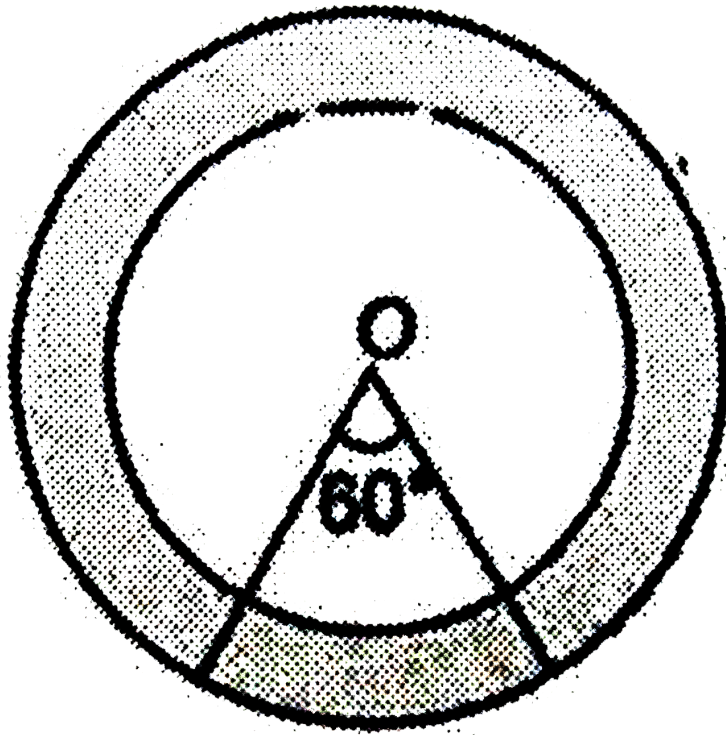
**9.** The minute hand of a clock is 2 cm long. Find the area of the face of the clock described by the minute hand between 7 am and 7 : 15 am.



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**10.** In the given figure, two concentric circles with centre O, have radii 21 cm and 42 cm. If  $\angle AOB = 60^\circ$ , Find the area of the shaded

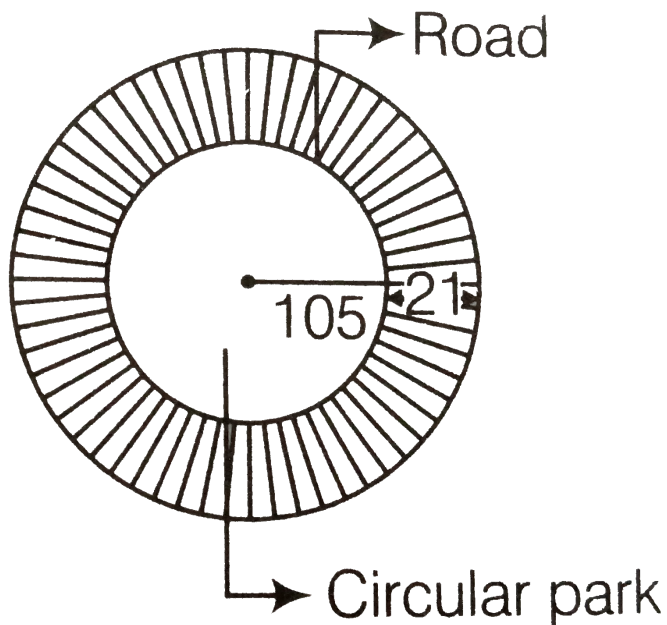
region



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**11.** A circular park is surrounded by a road 21 m wide. If the radius of the park is 105 m, then

find the area of the road.



[ $\therefore$  area of circle =  $\pi r^2$ ]



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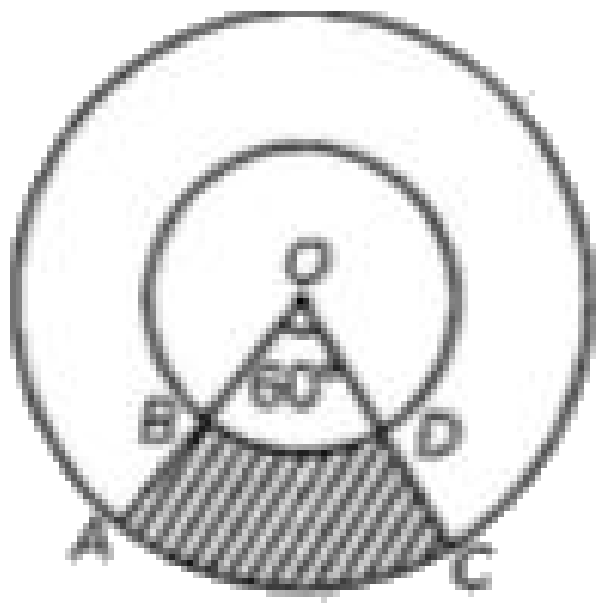
**12.** In the given figure, are shown two arcs PAQ and PBQ. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semi-circle drawn on PQ as diameter with centre M. If  $PQ = OP = 10$  cm show that area of shaded region is  $25\left(\sqrt{3} - \frac{\pi}{6}\right)$ .



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**13.** In the figure, the radii of two concentric circles with centre O are 7 cm and 14 cm and

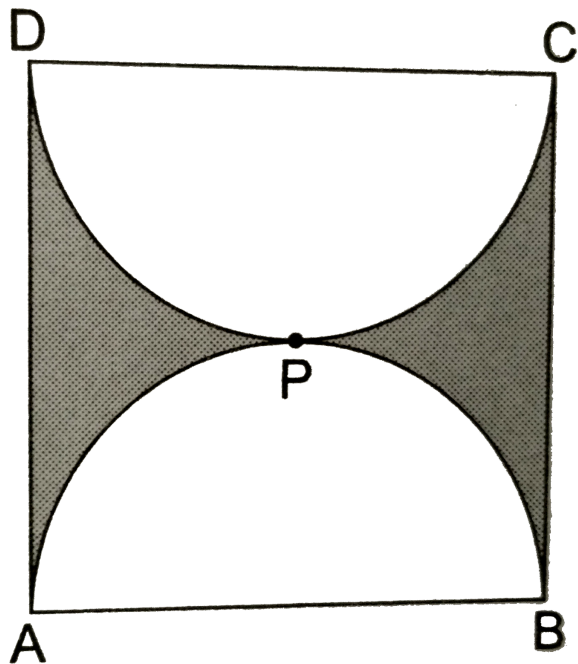
$\angle AOC = 60^\circ$ . Find the area of the shaded region.



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**14.** Find the perimeter of the shaded region in the figure, if ABCD is a square of side 14 cm and

APB and CPD are semicircles.



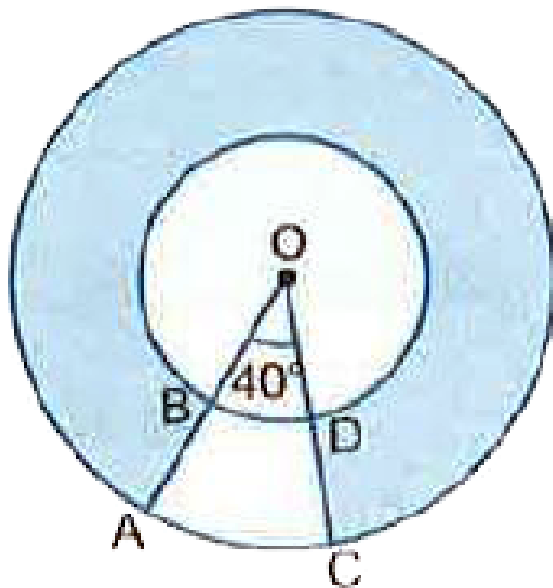
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15. In Fig. 12.69, find the area of the shaded region, enclosed between two concentric



circles of radii 7 cm and 14 cm where

$$\angle AOC = 40^\circ \left( \text{Use } \pi = \frac{22}{7} \right)$$



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Objective Type Question Short Answer Sa li Type Questions

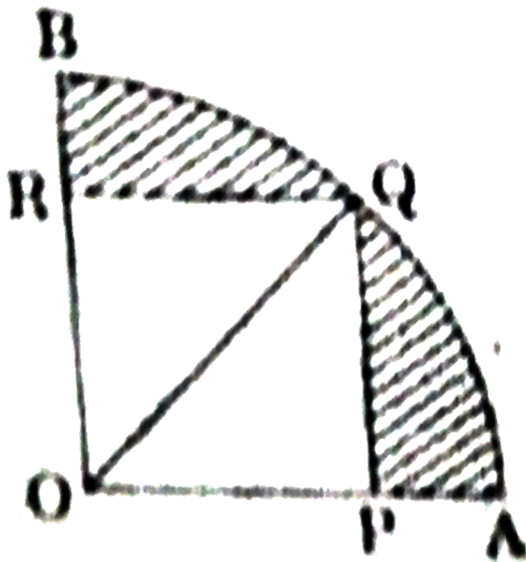
1. The area of a circular playground is  $22176 \text{ m}^2$ . Find the cost of fencing this ground at the rate of Rs. 50 per m.



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2. In Figure , a square OPQR is inscribed in a quadrant OAQB of a circle. If the radius of circle is  $6\sqrt{2}$  cm, find the area of the shaded

region



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3. The wheel of a motor cycle is of radius 35 cm. How many revolutions per minute must

the wheel make, so as to keep a speed of 66 km/h ?



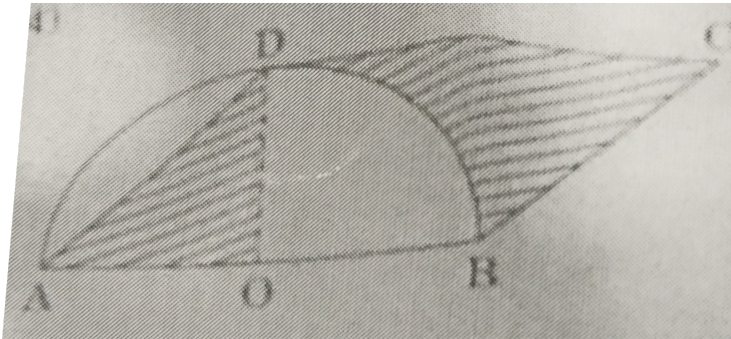
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4. A cow is tied with a rope of length 14m at the corner of a rectangular field of dimensions  $20m \times 16m$  . Find the area of the field in which the cow can graze.



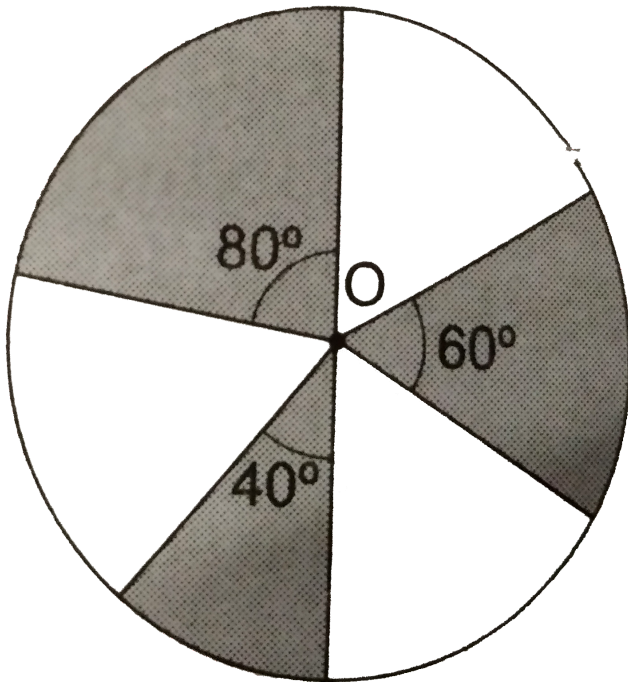
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5. In Figure , ABCD is a prallelogram. A semicircle with centre O and the diameter AB has been drawn and it passes through D. If AB = 12 cm and  $OD \perp AB$ . Then find the area of the shaded region. (Use  $\pi = 3.14$ )



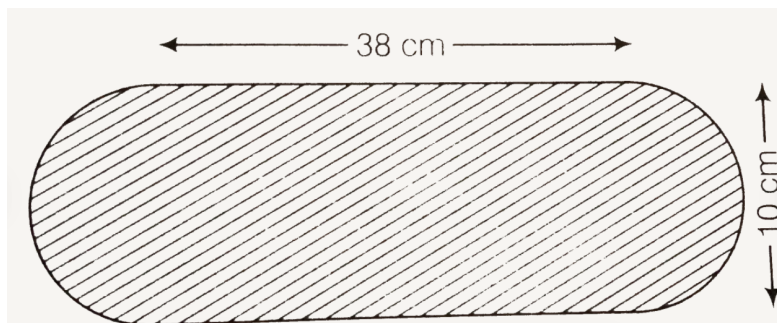
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6. In the given figure, three sectors of a circle of radius 7 cm, making angles of  $60^\circ$ ,  $80^\circ$  and  $40^\circ$  at the centre are shaded. Find the area of the shaded region.



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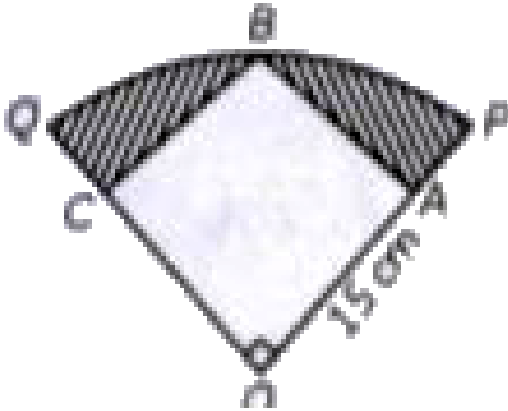
7. Find the area of the flower bed (with semi-circular ends) shown in figure.



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8. In the given figure, a square OABC is inscribed in a quadrant OPBQ. If  $OA = 15$  cm, find the area of the shaded region. (Use  $\pi =$

3.14)

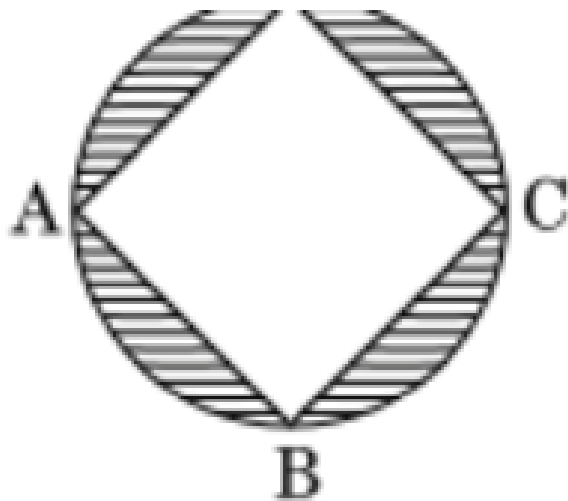


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9. In the given figure, ABCD is a square with side  $2\sqrt{2}$  and inscribed in a circle. Find the

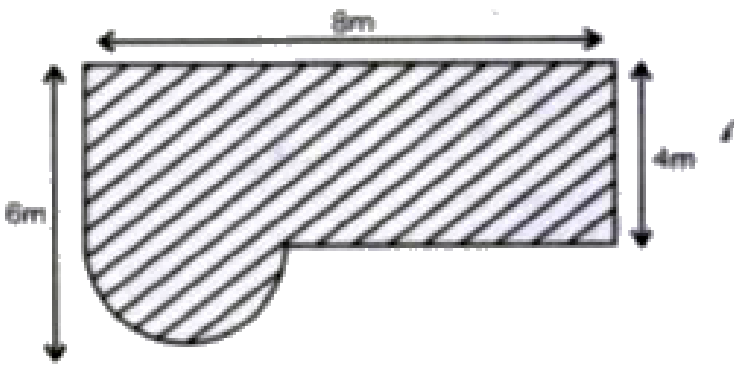


area of the shaded region. (Use  $\pi = 3.14$ )



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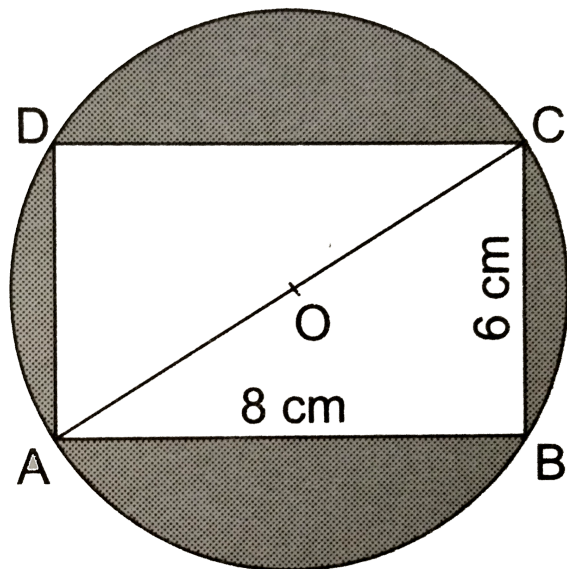
**10.** Find the area of the shaded field shown in the given figure



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11. Find the area of circle in the figure, if ABCD is a rectangle with sides 8 cm and 6 cm and O

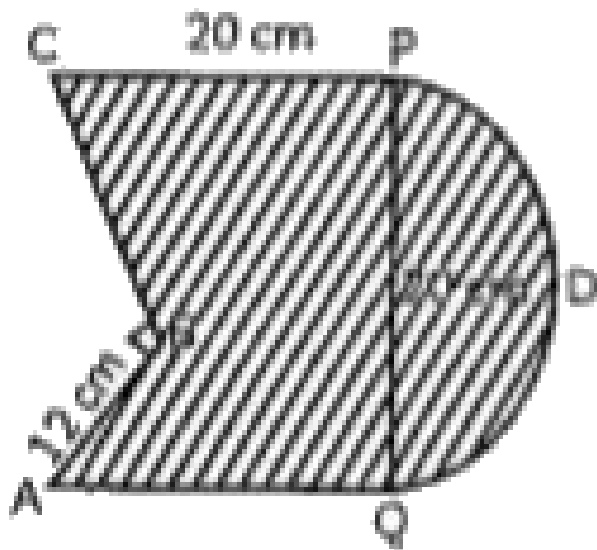
is the centre of circle. (Take  $\pi = 3.14$ )



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**12.** In the figure, PDQ is a semicircle of diameter 20 cm,  $CP = AQ = 20$  cm and  $AB = 12$  cm. If  $AB \perp BC$ , find the area of the shaded

region. (Use  $\pi = 3.14$ )



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**13.** In figure arcs have been drawn with radii 14 cm each and with centres P, Q and R. Find the

area of the shaded region .



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**14.** The difference between the radii of the smaller circle and the bigger circle is 7 cm and the difference between the areas of the two circles is 1078 sq cm. What is the radius of the smaller circle in cm?



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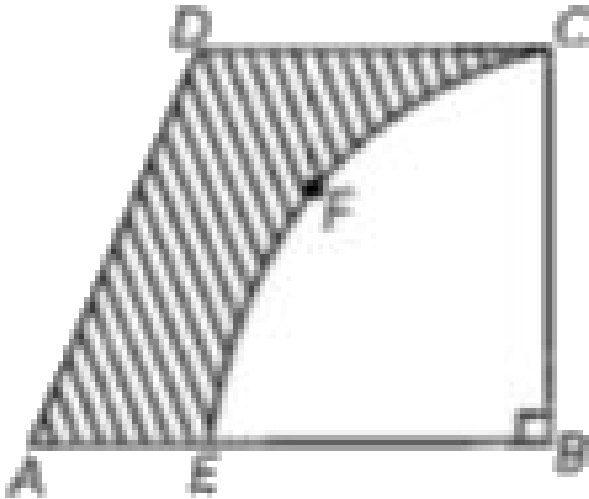
15. A wire when bent in the form of an equilateral triangle encloses an area of  $121\sqrt{3}cm^2$ . If the same wire is bent into the form of a circle, what will be the area of the circle? [Take  $\pi = \frac{22}{7}$ ]



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16. In the figure, ABCD is a trapezium with  $AB \parallel DC$ , and  $\angle ABC = 90^\circ$ . BCFE is a quadrant of a circle. If  $BC = CD = 4.2$  cm and  $AE = 18$  cm,

find the area of the shaded region.



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**17.** 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.

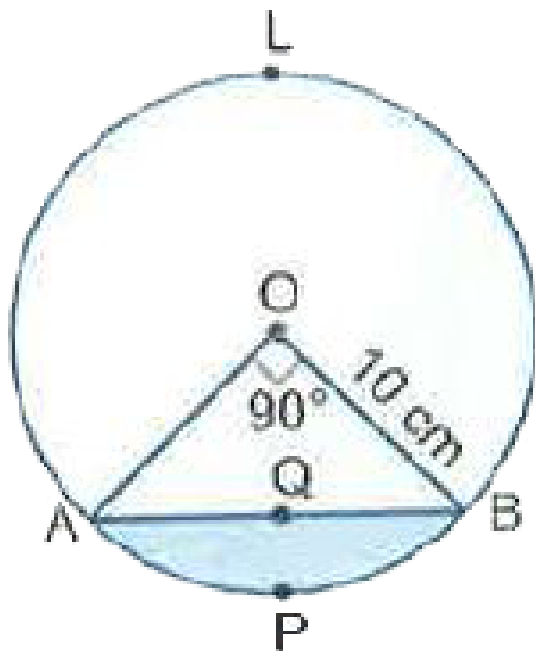


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**18.** In Fig. 12.70. a chord  $AB$  of a circle, with centre  $O$  and radius  $10$  cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment  $AQBP$ . Hence Find the area



of major segment ALBQA. (Use  $\pi = 3.14$ )



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**19.** Find the area of the minor segment of a circle of radius  $14\text{ cm}$ , when its central angle

is  $60^\circ$ . Also find the area of the corresponding major segment.  $\left[ \text{Use } \pi = \frac{22}{7} \right]$



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20. about to only mathematics

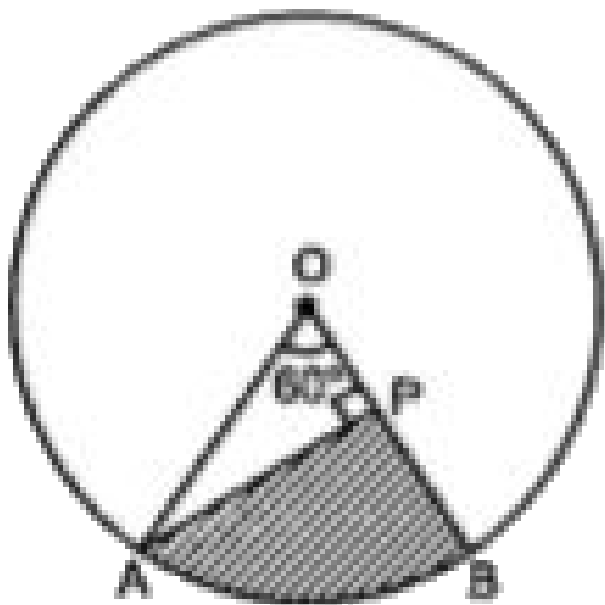


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21. In the given figure, AOB is a sector of angle  $60^\circ$  of a circle with centre O and radius 17 cm.

If  $AP \perp OB$  and  $AP = 15$  cm, find the area of

the shaded region.



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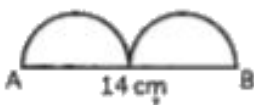
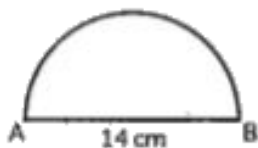
22. A park is of the shape of a circle of diameter 7 m. It is surrounded by a path of width 0.7 m. Find the expenditure of

cementing the path, if its cost is Rs 110 per sq. m.



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23. In each figure, all the semi-circles are of the same size and  $AB = 14$  cm.



Find the area of each figure.



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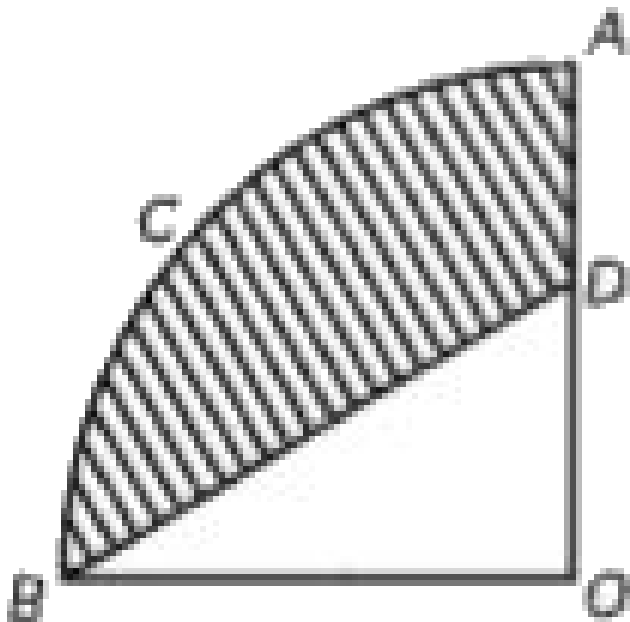
**24.** In figure, a square is inscribed in a circle of diameter  $d$  and another square is circumscribing the circle. Is the area of the outer square four times the area of the inner square? Give reason for your answer.



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**25.** In figure,  $OACB$  is a quadrant of a circle with centre  $O$  and radius  $7$  cm. If  $AD = 2$  cm,

find the area of the shaded region.



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**26.** A circular pond is of diameter 43 m is surrounded by a 3 m wide path. Find the cost

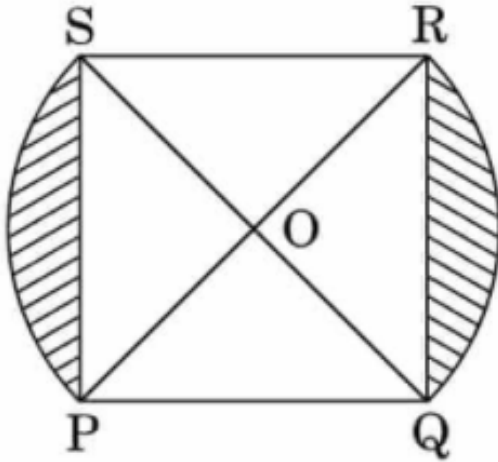
of constructing the path at the rate of 25 per  $\text{m}^2$ .



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**27.** . In the following figure, PQRS is square lawn with side  $PQ = 42$  metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersections of its diagonals. Find the total area of the two

flower beds (shaded parts).



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Objective Type Question Long Answer Type Questions



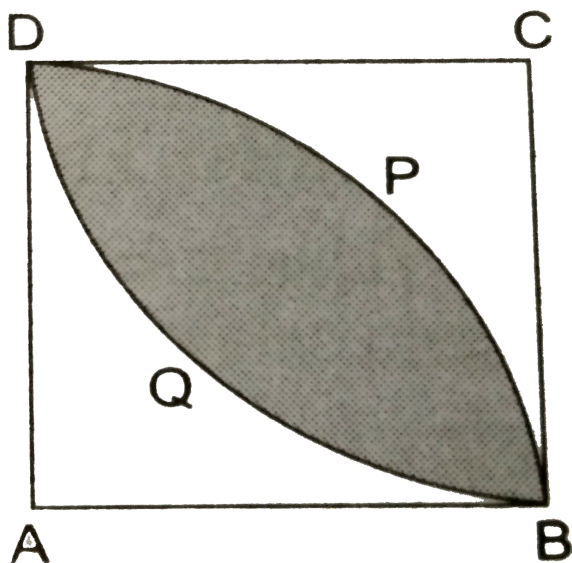
1. Find the area of the shaded region in Fig. 12.19, if  $PQ = 24 \text{ cm}$ ,  $PR = 7 \text{ cm}$  and  $O$  is the centre of the circle.



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2. In the given figure, ABCD is a square of side 7cm, DPBA and DQBC are quadrants of circles each of the radius 7 cm. Find the area of

shaded region.



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3. Two circles touch internally. The sum of their areas is  $116\pi\text{cm}^2$  and the distance

between their centres is 6 cm. find the radii of the circles.



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4. Sides of a triangular field are 15 m, 16m and 17m. With the three corners of the field a cow, a buffalo and a horse are tied separately with ropes of length 7m each to graze in the field. Find the area of the field which cannot be grazed by the three animals.



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5. In the given figure ABCD is a trapezium in which

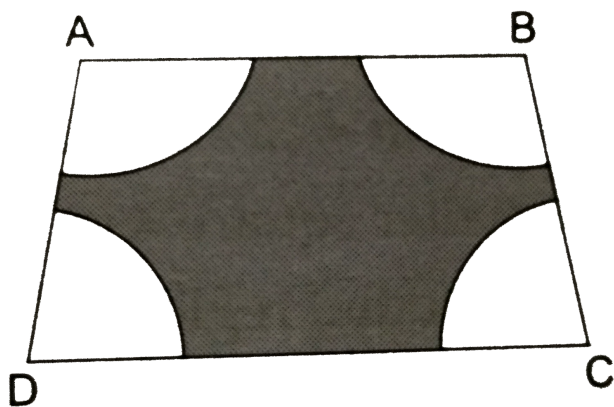
$AB \parallel DC$ ,  $AB = 18\text{cm}$ ,  $DC = 32\text{cm}$  and

the distance between AB and DC is 14 cm. If

arcs of equal radii 7 cm have been drawn with

centres A,B,C and D then find the area of the

shaded region.





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6. A chord PQ of a circle of radius 10 cm makes an angle of  $60^\circ$  at the centre of the circle. Find the area of the major and the minor segment



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7. In the given figure, the side of square is 28 cm and radius of each circle is half of the

length of the sides of the square where  $O$  and  $O'$  are centres of the circles. Find the area of shaded region



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8. find of the An archery target has three regions formed by three concentric circles as shown in Fig 15.8. If the diameters of the concentric circles are in the ratio  $1:2:3$ , then find the ratio of the areas of three regions Fig.

15.8



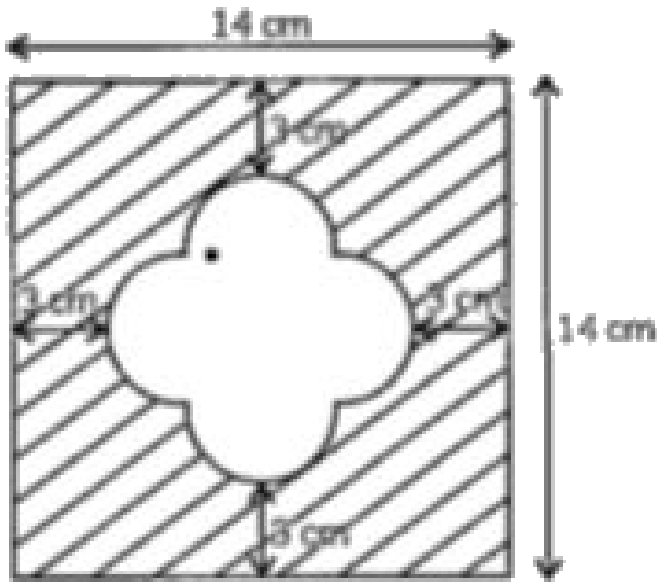
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9. Find the difference of the areas of two segments of a circle formed by a chord of length 5cm subtending an angle of  $90^\circ$  at the centre.



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10. Find the area of the shaded region given in the given figure



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**11.** Find the area of the shaded region in Fig. 8, where  $APD$ ,  $AQB$ ,  $BRC$  and  $CSD$  are semi-circles of diameter 14 cm, 3.5 cm, 7 cm and 3.5 cm respectively.





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**12.** An elastic belt is placed around the rim of a pulley of radius 5 cm (Fig.) From one point C on the belt, the elastic belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also, find the shaded area.[use  $\pi = 3.14$  and  $\sqrt{3} = 1.73$ ]



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**13.** In the adjoining figure,  $O$  is the centre of the circle with  $AC = 24$  cm,  $AB = 7$  cm and  $\angle BOD = 90^\circ$ . Find the area of the shaded region.



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**14.** In the given figure, is shown a sector  $OAP$  of a circle with centre  $O$ , containing  $\angle \theta$ .  $AB$  is perpendicular to the radius  $OA$  and meets  $OP$  produced at  $B$ . Prove that the perimeter of

shaded

region

is

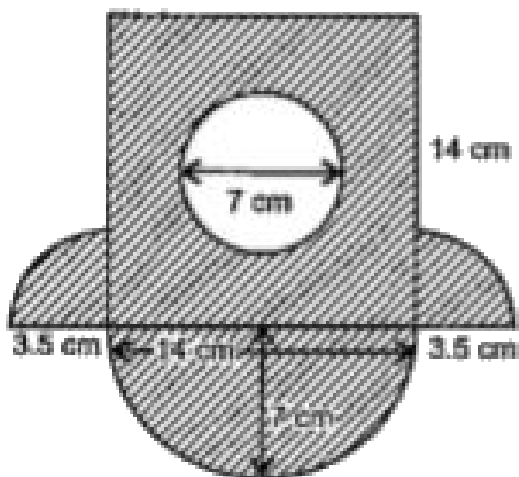
$$r \left[ \tan \theta + \sec \theta + \pi \frac{\theta}{180} - 1 \right]$$



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15. In figure, find the area of the shaded

region.  $\left( \text{Use } \pi = \frac{22}{7} \right)$



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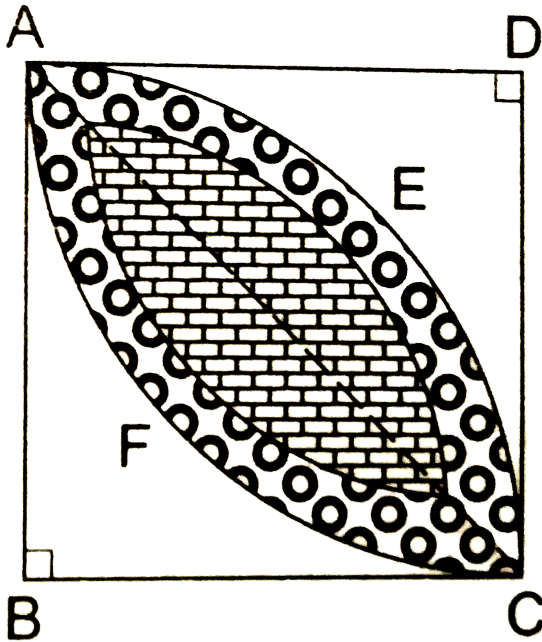
**16.** The floor of a room is of dimensions  $5\text{m} \times 4\text{m}$  and it is covered with circular tiles of diameters  $50\text{ cm}$  each. Find the area of the floor that remains uncovered with tiles. (Use  $\pi = 3.14$ )



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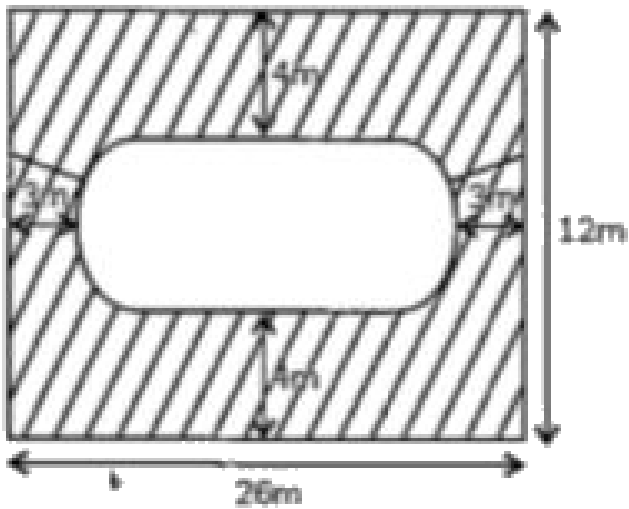
**17.** Calculate the area of the designed region in the given figure, common between two

quadrants of circles of radius 7cm each.



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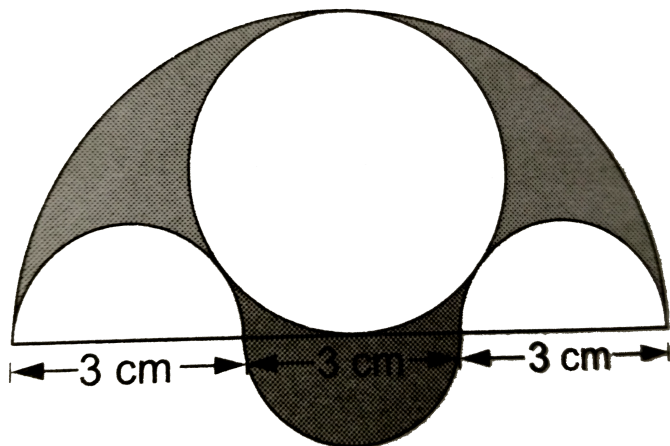
**18.** Find the area of the shaded field shown in the given figure.



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**19.** Three semicircles each of diameter 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure.

Find the area of the shaded region.



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