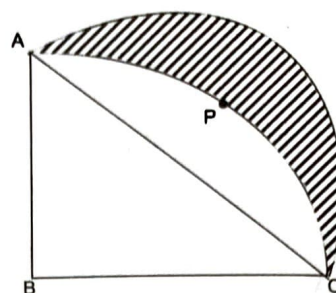


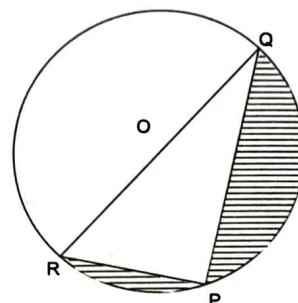
AREAS RELATED TO CIRCLES

1. In figure ABC is a quadrant of a circle of radius 14 cm and a semi-circle is drawn with BC as diameter. Find the area of the shaded region.



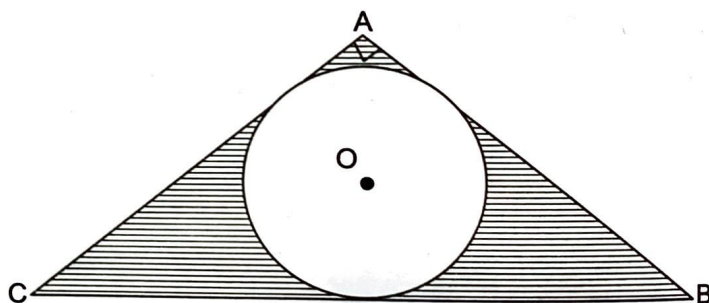
(CBSE 2007-08, 3 marks)

2. In figure PQ = 24 cm, PR = 7 cm and O is the centre of the circle. Find the area of shaded region (take $\pi = 3.14$)



(CBSE 2008-09, 3 marks)

3. In figure, ABC is a right triangle right angled at A. Find the area of shaded region if AB = 6 cm, BC = 10 cm and O is the centre of incircle of $\triangle ABC$. (take $\pi = 3.14$)



(CBSE 2008-09, 6 marks)

4. The wheels of a car are of diameter 80 cm each. How many complete revolution does each wheel make in 10 minutes when the car is traveling at a speed of 66 km/hr? (CBSE 2011-12, 3 marks)
5. If the circumference and area of a circle are numerically equal, then the diameter of the circle is: (CBSE 2012-13, 1 mark)

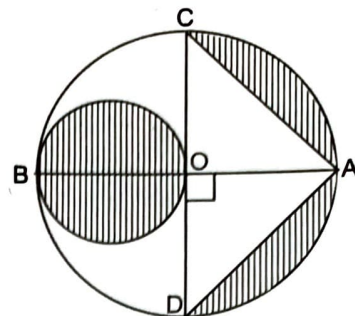
(A) $\frac{\pi}{2}$
(C) 4

(B) 2
(D) 2π

6. If the difference between the circumference and the radius of a circle is 37 cm, then using $\pi = \frac{22}{7}$, the circumference (in cm) of the circle is: (CBSE 2012-13, 1 mark)
- (A) 154
(C) 14
- (B) 44
(D) 7

7. Two circular pieces of equal radii and maximum area, touch each other are cut from a rectangular card board of dimensions 14 cm x 7 cm. Find the area of the remaining card board. [Use $\pi = \frac{22}{7}$] (CBSE 2012-13, 2 marks)

8. In figure AB and CD are two diameters of a circle with centre O, which are perpendicular to each other. OB is the diameter of the smaller circle. If $OA = 7$ cm, find the area of the shaded region. [Use $\pi = \frac{22}{7}$]

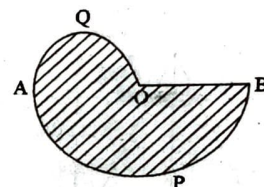


(CBSE 2012-13, 3 marks)

9. 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. (Use $\pi = \frac{22}{7}$)

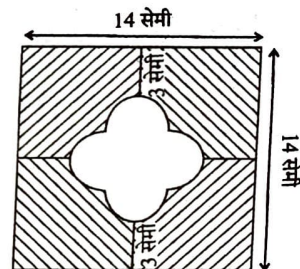
(CBSE 2012-13, 3 marks)

10. In figure, APB and AQO are semicircles, and $AO = OB$. If the perimeter of the figure is 40 cm, find the area of the shaded region.
 [Use $\pi = \frac{22}{7}$]



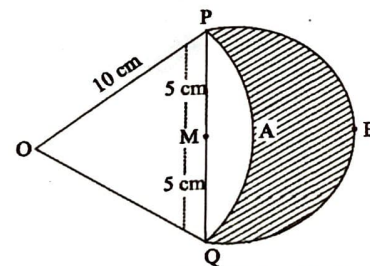
(CBSE 2014-15, 3 marks)

11. In figure, find the area of the shaded region
 [Use $\pi = 3.14$]



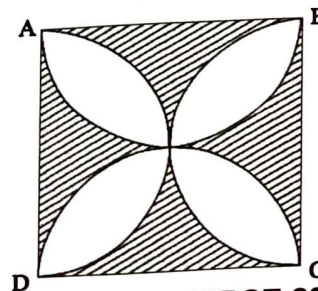
(CBSE 2014-15, 3 marks)

12. In 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 $OP = PQ = 10$ cm show that area of shaded region is $25\left(\sqrt{3} - \frac{\pi}{6}\right) \text{ cm}^2$.



(CBSE 2015-16, 3 marks)

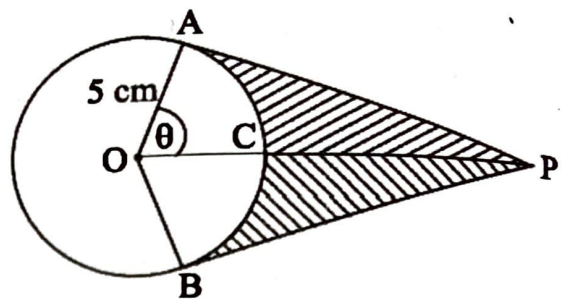
13. In figure, ABCD is a square of side 14 cm. Semi-circles are drawn with each side of square as diameter. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)



(CBSE 2015-16, 3 marks)

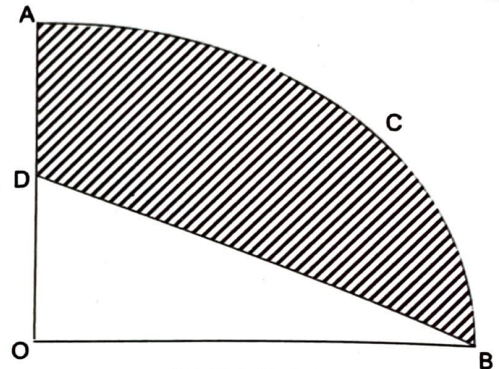
14. An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point C on the belt, the elastic belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also find the shaded area.

(Use $\pi = 314$ and $\sqrt{3} = 1.73$)



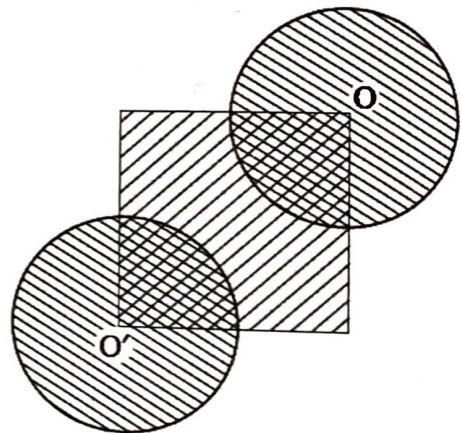
(CBSE 2015-16, 4 marks)

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



(CBSE 2016-17, 3 marks)

16. In the given figure, the side of square is 28 cm and radius of each circle is half of the length of the side of the square where O and O' are centres of the circles. Find the area of shaded region.

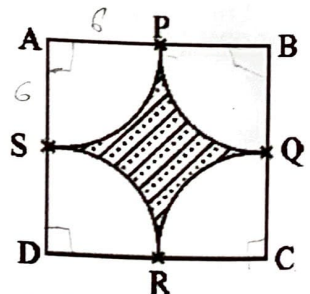


(CBSE 2016-17, 4 marks)

17. A chord PQ of a circle of radius 10 cm subtends an angle of 60° at the centre of circle. Find the area of major and minor segments of the circle.

(CBSE 2016-17, 4 marks)

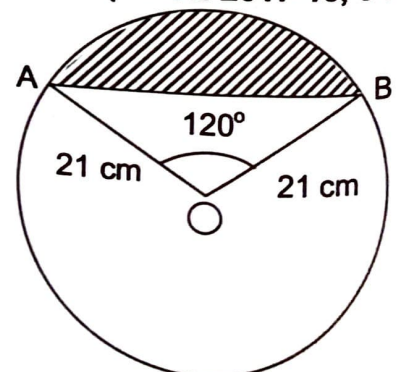
18. Find the area of the shaded region in figure, where arcs drawn with centres A, B, C and D intersect in pairs at mid-points P, Q, R and S of the sides AB, BC, CD and DA respectively of a square ABCD of side 12 cm. [Use $\pi = 3.14$]



(CBSE 2017-18, 3 marks)

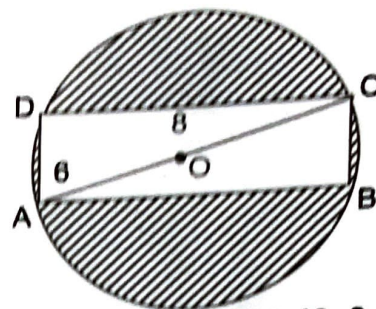
19. Find the area of the segment shown in Figure, if radius of the circle is 21 cm and $\angle AOB = 120^\circ$.

[Use $\pi = \frac{22}{7}$]



(CBSE 2018-19, 3 marks)

20. Find the area of the shaded region in figure, if ABCD is a rectangle with sides 8 cm and 6 cm and O is the centre of circle. (Take $\pi = 3.14$)



(CBSE 2018-19, 3 marks)

21. A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle. (Use $\pi = \frac{22}{7}$) (CBSE 2019-20, 2 marks)
22. The area of a quadrant of a circle where the circumference of the circle is 176 m, is (CBSE 2021-22, TERM-I, 1 mark)
- (A) 2464 m^2 (B) 1232 m^2
(C) 616 m^2 (D) 308 m^2
23. The minute hand of a clock is 84 cm long. The distance covered by the tip of the minute hand from 10 : 10 am to 10 : 25 am is (CBSE 2021-22, TERM-I, 1 mark)
- (A) 44 cm (B) 88 cm
(C) 132 cm (D) 176 cm
24. The diameter of a car wheel is 42 cm. The number of complete revolutions it will make in moving 132 km is (CBSE 2021-22, TERM-I, 1 mark)
- (A) 10^4 (B) 10^5
(C) 10^6 (D) 10^3
25. The area of a square that can be inscribed in a circle of area $\frac{1408}{7} \text{ cm}^2$ is (CBSE 2021-22, TERM-I, 1 mark)
- (A) 321 cm^2 (B) 642 cm^2
(C) 128 cm^2 (D) 256 cm^2
26. If the perimeter of a circle is half that of a square, then the ratio of the area of the circle to the area of the square is (CBSE 2021-22, TERM-I, 1 mark)
- (A) 22 : 7 (B) 11 : 7
(C) 7 : 11 (D) 7 : 22
27. The circumferences of two circles are in the ratio 4 : 5. What is the ratio of their radii? (CBSE 2022-23, 1 mark)
- (A) 16 : 25 (B) 25 : 16
(C) $2 : \sqrt{5}$ (D) 4 : 5
28. What is the area of a semi-circle of diameter 'd'? (CBSE 2022-23, 1 mark)
- (A) $\frac{1}{16} \pi d^2$ (B) $\frac{1}{4} \pi d^2$
(C) $\frac{1}{8} \pi d^2$ (D) $\frac{1}{2} \pi d^2$

29. The area of a sector of angle α (in degrees) of a circle with radius R is: (CBSE 2022-23, 1 mark)

(A) $\frac{\alpha}{180} \times 2\pi r$

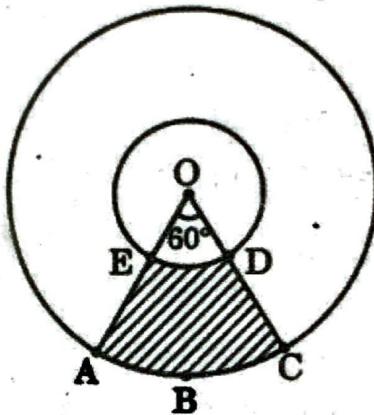
(B) $\frac{\alpha}{360} \times \pi r$

(C) $\frac{\alpha}{180} \times \pi R^2$

(D) $\frac{\alpha}{180} \times \pi R^2$

30. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of the sector formed by the arc. Also, find the length of the arc. (CBSE 2022-23, 3 marks)

31. In the given figure, two concentric circles with centre O are shown. Radii of the circles are 2 cm and 5 cm respectively. Find the area of the shaded region.



(CBSE 2022-23, 3 marks)

32. A chord of a circle of radius 14 cm subtends an angle of 60° at the centre. Find the area of the corresponding minor segment of the circle. Also find the area of the major segment of the circle. (CBSE 2022-23, 5 marks)

33. Flower beds look beautiful growing in gardens. One such circular park of radius ' r ' m, has two segments with flowers. One segment which subtends an angle of 90° at the centre is full of red roses, while the other segment with central angle 60° is full of yellow coloured flowers. [See figure]

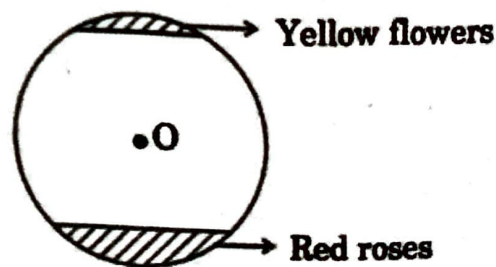
It is given that the combined area of the two segments (of flowers) is $256\frac{2}{3}$ sq m.

Based on the above, answer the following questions:

- Write an equation representing the total area of the two segments in terms of ' r '.
- Find the value of ' r '.
- (a) Find the area of the segment with red roses.

OR

- (b) Find the area of the segment with yellow flowers.



(CBSE 2022-23, 4 marks)

34. Perimeter of a sector of a circle whose central angle is 90° and radius 7 cm is:
 (A) 35 cm
 (C) 22 cm
 (B) 11 cm
 (D) 25 cm
(CBSE 2023-24, 1 Mark)
35. If an arc subtends an angle of 90° at the centre of a circle, then the ratio of its length to the circumference of the circle is:
 (A) 2 : 3
 (C) 4 : 1
 (B) 1 : 4
 (D) 1 : 3
(CBSE 2023-24, 1 Mark)
36. The area of the sector of a circle of radius 12 cm is $60\pi \text{ cm}^2$. The central angle of this sector is:
 (A) 120°
 (C) 75°
 (B) 6°
 (D) 150°
(CBSE 2023-24, 1 Mark)
37. The perimeter of the sector of a circle of radius 21 cm which subtends an angle of 60° at the centre of circle is:
 (A) 22 cm
 (C) 64 cm
 (B) 43 cm
 (D) 462 cm
(CBSE 2023-24, 1 Mark)
38. The length of an arc of a circle with radius 12 cm is $10\pi \text{ cm}$. The angle subtended by the arc at the centre of the circle, is:
 (A) 120°
 (C) 75°
 (B) 6°
 (D) 150°
(CBSE 2023-24, 1 Mark)
39. (a) The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand in 5 minutes.
(CBSE 2023-24, 2 Marks)
- OR**
- (b) Find the length of the arc of a circle which subtends an angle of 60° at the centre of the circle of radius 42 cm.
40. An arc of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding major sector. (Use $\pi = 3.14$)
(CBSE 2023-24, 3 Marks)
41. An arc of a circle of radius 21 cm subtends an angle of 60° at the centre. Find:
(CBSE 2023-24, 5 Marks)
- (i) the length of the arc.
 (ii) the area of the minor segment of the circle made by the corresponding chord.
42. The perimeter of a certain sector of a circle of radius 5.6 m is 20.0 m. Find the area of the sector.
(CBSE 2023-24, 5 Marks)