MATHEMATICS

AREAS RELATED TO CIRCLES

1. Area of a semi-circle is equal to

(A) πr^2 (B) $\frac{1}{2}\pi r^2$

(C) $\frac{1}{3}\pi r^2$ (D) $\frac{1}{4}\pi r^2$

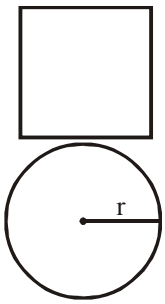
ANS : B

2. A blacksmith Rajesh bent a steel wire, in the form of a square, encloses an area of 121 sq cm. The same wire he bent in the form of a circle, then the area of the circle is

(A) 22 cm^2 (B) 154 cm^2

(C) 44 cm^2 (D) 77 cm^2

SOL : Area of square = 121 cm^2



Side of the square $= \sqrt{121}$ cm = 11 cm.

Perimeter of the square = (4×11) cm = 44 cm.

$\therefore$ Length of the wire = 44 cm.

$\therefore$ Circumference of the circle = length of the wire = 44 cm

Let the radius of the circle = r cm.

Then, $2\pi r = 44 \Rightarrow 2 \times \frac{22}{7} r = 44 \Rightarrow r = 7.$

Hence, area of the circle = $\pi r^2 = \left(\frac{22}{7} \times 7 \times 7\right)$ cm^2 = 154 cm^2.

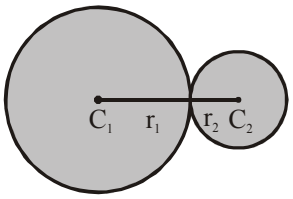
ANS : B

3. Two circles touch externally. The sum of the their areas is 130π sq. cm. and the distance between their centers is 14 cm, then the radii of the circles are

(A) 14 cm, 3 cm (B) 11 cm, 3 cm

(C) 7 cm, 3 cm (D) 28 cm, 6 cm.

SOL : Let the radii of the circles be r_1 cm and r_2 cm respectively.



$\pi r_1^2 + \pi r_2^2 = 130\pi$

$\Rightarrow\ r_1^2 + r_2^2 = 130$ … (i)

and $r_1 + r_2 = 14$ … (ii)

Now $(r_1 + r_2)^2 = r_1^2 + r_2^2 + 2r_1r_2$ … (iii)

Putting the values of $(r_1 + r_2)$ and $(r_1^2 + r_2^2)$ from (i) and (ii) in (iii), we get

$(14)^2 = 130 + 2r_1r_2$

$\Rightarrow$ $196 = 130 + 2r_1r_2$ $\Rightarrow$ $196 - 130 = 2r_1r_2$

$\Rightarrow$ $2r_1r_2 = 66$

$\Rightarrow$ $r_1r_2 = \frac{66}{2} = 33$ … (iv)

Now $(r_1 - r_2)^2 = (r_1 + r_2)^2 - 4r_1r_2 = (14)^2 - 4(33)$ [using (4)]

$= 196 - 132 = 64$

$\Rightarrow$ $r_1 - r_2 = \sqrt{64} = 8$ … (v)

Solving equations (ii) and (v), we get $r_1 = 11$ cm and $r_2 = 3$ cm.

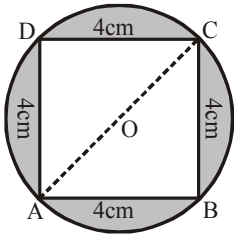
ANS : B

4. A square of side 4cm is inscribed in a circle, then the area enclosed between the circle and the square is

(A) $10\frac{1}{7}\text{cm}^2$ (B) $9\frac{1}{7}\text{cm}^2$

(C) $25\frac{1}{7}\text{cm}^2$ (D) 16 cm^2.

SOL : Here the side of the square = 4 cm; inscribed in a circle.



In Δ ACD right angled at D

$$AC^2 = AD^2 + DC^2$$

$$= \sqrt{4^2 + 4^2} = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$$

Radius of the circle

$$= AO = \frac{1}{2}AC = \frac{1}{2}\left(4\sqrt{2}\right) = 2\sqrt{2}$$

Area of the circle

$$= \pi r^2 = \frac{22}{7}\left(2\sqrt{2}\right)^2 = \frac{176}{7}\text{cm}^2$$

Area pf the square =$(\text{side})^2 = (4)^2 = 16$

Required area = Area of the circle – area of square $= \left(\frac{176}{7} - 16\right)\text{cm}^2 = \frac{64}{7}\text{cm}^2 = 9\frac{1}{7}\text{cm}^2$.

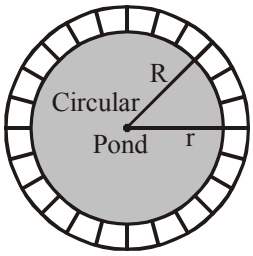
ANS : B

5. The diameter of a circular pond is 17.5 m. If is surrounded by a path of width 3.5 m, then the area of the path is

(A) 231m^2 (B) 261 m^2

(C) 241 m^2 (D) 281 m^2.

SOL : Diameter of circular pond = 17.5m



Width of the path = 3.5 m

Diameter of the outer path

= (17.5 + 7)m = 24.5 m

Area of the circular pond $= \pi r^2$

$$= \frac{22}{7}\left(\frac{17.5}{2}\right)^2 = \frac{22}{7} \times \frac{17.5}{2} \times \frac{17.5}{2}$$

$$= \frac{11 \times 17.5 \times 2.5}{2} = 240.625 \text{ sq. m.}$$

Area of the pond + path = πR^2

$$= \frac{22}{7}\left(\frac{24.5}{2}\right)\left(\frac{24.5}{2}\right) = \frac{11 \times 3.5 \times 24.5}{2} = 471.625 \text{ m}^2$$

Area of path = 471.625 –240.625 = 231m^2.

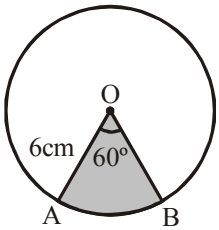
ANS : A

6. The area and perimeter of a sector of a circle with radius 6 cm if angle of the sector is 60º , is

(A) 18.86 cm^2, 18.28 cm (B) 18.76 cm^2, 18.14 cm

(C) 18 cm^2, 28 cm (D) 17 cm^2, 17.14 cm

SOL : The area A of a sector of angle $\theta^o = \frac{\theta^o}{360^o} \times \pi r^2$



$$\therefore \quad A = \frac{60^o}{360^o} \times \frac{22}{7} \times (6)^2$$

$$= \frac{60^o}{360^o} \times \frac{22}{7} \times 6 \times 6 = \frac{132}{7} = 18.8571 \text{ cm}^2$$

Perimeter of a sector of angle $\theta^o = 2r + \frac{\pi r \theta^o}{180^o}$

Perimeter of a sector of angle 60º

$$= 2\times 6+\frac{22}{7}\times\frac{6}{180^\circ}\times 60^\circ = 12+\frac{44}{7}$$

$= 12 + 6.28 = 18.28$ cm

Hence, Area = 18.86 cm^2 and perimeter = 18.28 cm.

ANS : A

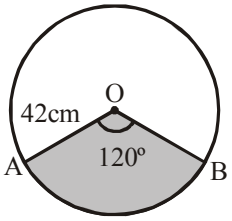
7. A sector is cut from a circle of radius 42 cm. The angle of the sector is 120º, then the length of its arc and area is

(A) 44 cm, 924 cm^2 (B) 88 cm, 1848 cm^2

(C) 132 cm, 824 cm^2 (D) 42 cm, 1048 cm^2

SOL : Length of arc of a sector of angle θ and radius

$$r = \ell = \frac{\theta^\circ}{180^\circ}\times \pi r$$



$$\Rightarrow \qquad \ell = \frac{120^\circ}{180^\circ}\times\frac{22}{7}\times 42 = 88 \text{ cm.}$$

$$\text{Area of the sector } = A = \frac{\theta^\circ}{360^\circ}\times \pi r^2$$

$$\Rightarrow \qquad A = \frac{120^\circ}{360^\circ}\times\frac{22}{7}\times(42)^2$$

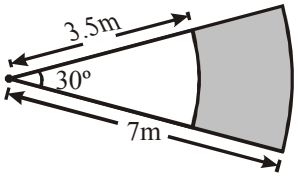
$$= \frac{120^\circ}{360^\circ}\times\frac{22}{7}\times 42\times 42 \;= \frac{1}{3}\times 22\times 6\times 42$$

A = 1848 cm^2

Hence, length of arc = 88 cm and area = 1848 cm^2

ANS : B

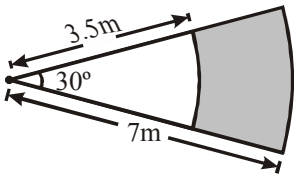
8. Flowers are to be planted in the shaded portion which is shown by sectors of two concentric circles of radii 7 m and 3.5 m, then the area of the shaded region is $\left(\text{use } \pi = \frac{22}{7}\right)$



(A) 9.625 cm^2 (B) 9 cm^2

(C) 10 cm^2 (D) 8.5 cm^2.

SOL : Area of the shaded region



=(area of the sector with r = 7 m, $\theta = 30^\circ$)

– (area of the sector with r = 3.5 m, $\theta = 30^\circ$)

$$= \left[\left(\frac{22}{7}\times 7\times 7\times \frac{30^\circ}{360^\circ}\right) - \left(\frac{22}{7}\times \frac{7}{2}\times \frac{7}{2}\times \frac{30^\circ}{360^\circ}\right)\right] m^2$$

$$= \left(\frac{77}{6} - \frac{77}{24}\right) m^2 = \frac{77}{8} m^2 = 9.625\ m^2.$$

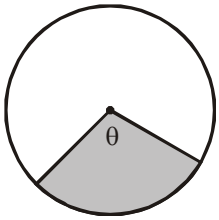
ANS : A

9. The radius of a circle is 14 cm and the area of the sector is filled with water is 102.7 cm^2, then the central angle of the sector is

(A) 30º (B) 45º

(C) 60º (D) 90º.

SOL : Radius of circle = 14 cm



$\therefore$ Area of circle = π (radius)^2

$$= \frac{22}{7}(14)^2 = 616\ cm^2$$

Area of sector = 102.7 cm^2

Let central angle of sector = θ°

We have

$$\text{Area of sector} = \frac{\theta^\circ}{360^\circ} \times \text{area of circle}$$

$$102.7 = \frac{\theta^\circ}{360^\circ} \times 616$$

$$\theta^\circ = \frac{(102.7)360^\circ}{616} = 60^\circ \text{ (nearly)}$$

$\therefore$ The central angle of the sector is nearly 60º.

ANS : C

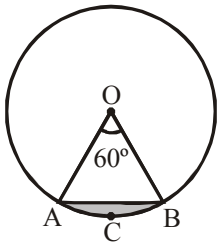
10. In a circle of radius 21 cm, an arc subtends an angle of 60º at the centre, then the length of the arc and the area of the sector is

(A) 22 cm, 231 cm^2 (B) 11 cm, 200 cm^2

(C) 44 cm, 100 cm^2 (D) 11 cm, 241 cm^2

SOL : Let AB be the given arc subtending an angle of 60º at the centre.

Here, r = 21 cm and $\theta = 60^\circ$



Length of the arc ABC = $\frac{2\pi r\theta^\circ}{360^\circ}$ cm

$$= \left(2 \times \frac{22}{7} \times 21 \times \frac{60^\circ}{360^\circ}\right) \text{cm} = 22 \text{ cm}$$

Area of the sector OACBO = $\frac{\pi r^2\theta^\circ}{360^\circ} cm^2$

$$= \left(\frac{22}{7} \times 21 \times 21 \times \frac{60^\circ}{360^\circ}\right) cm^2 = 231 \text{ } cm^2$$

ANS : A

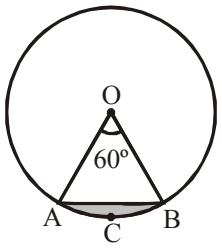
11. In a circle of radius 21 cm, an arc subtends an angle of 60º at the centre, then the area of the minor segment is and the area of the major segment is

(A) 41 cm^2, 1355 cm^2 (B) 40 cm^2, 1255 cm^2

(C) 40.05 cm^2, 1155 cm^2 (D) 39.05 cm^2, 1100 cm^2

SOL : Area of the minor segment ACBA

=(area of the sector OACB) – area of the Δ OAB)



$$= \left(231 - \frac{1}{2} r^2 \sin\theta\right) cm^2$$

$$= \left[231 - \left(\frac{1}{2} \times 21 \times 21 \times \sin 60^\circ\right)\right] cm^2$$

$$= 231 - \frac{441\sqrt{3}}{4} cm^2 = 40.05 \text{ cm}^2$$

Area of the major segment

= Area of the circle – area of the minor segment ACBA.

$$= \left(\pi r^2 - 231\right) cm^2$$

$$= \left(\frac{22}{7} \times 21 \times 21 - 231\right) cm^2 = (1386 - 231) cm^2 = 1155 \text{ cm}^2.$$

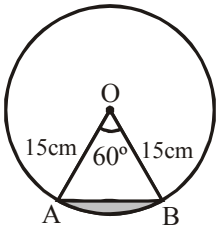
ANS : C

12. A chord AB of a circle of radius 15 cm subtends an angle of 60º at the centre of the circle, then the area of the major and minor segments is [Take $\pi = 3.14$, $\sqrt{3} = 1.73$]

(A) 681 cm^2, 25 cm^2 (B) 706 cm^2, 26.43 cm^2

(C) 680.07 cm^2, 26.43 cm^2 (D) 686.07 cm^2, 20.43 cm^2.

.SOL : The area of a minor segment of angle θ in a circle of radius r is given by



$$A = r^2\left[\frac{\pi\theta^\circ}{360^\circ} - \frac{1}{2}\sin\theta^\circ\right]$$

Here r = 15cm and $\theta^\circ = 60^\circ$

$$A = (15)^2\left[\frac{3.14 \times 60^\circ}{360^\circ} - \frac{1}{2}\sin 60^\circ\right] cm^2$$

$$= 225\left[\frac{3.14}{6} - \frac{\sqrt{3}}{4}\right] cm^2$$

$= 225[\ 0.5233 - 0.4325]\ cm^2$

$= 225 \times\ 0.0908\ cm^2 = 20.43\ cm^2$

Area of major segment = Area of circle – Area of minor segment

$= [3.14 \times (15)^2 - 20.43] cm^2$

$= [706.5 - 20.43]\ cm^2$

$= 686.07\ cm^2.$

ANS : D

13. If the radii of two circles are 7 cm and 24 cm, then the radius of circle having area equal to the sum of the areas of the two circles, is

(A) 31 cm (B) 25 cm

(C) 17 cm (D) 28 cm

ANS : B

14. The cost of fencing a circular field at the rate of Rs. 24 per metre is RS. 5280. Then the cost of ploughing the field, at the rate of 50 paise/m^2, is

(A) Rs. 2875 (B) Rs. 3850

(C) Rs. 1925 (D) Rs. 1825

ANS : C

15. The inner circumference of a circular track is 220 m, and the track is 14 m wide. The cost of leveling the track, at 50 paise/m^2, is

(A) Rs. 1848 (B) Rs. 1663.2

(C) Rs. 1478.4 (D) None of these

ANS : A

16. The area of a sector, of a circle with radius 7 cm and angle of the sector is 60^o. is

(A) $\frac{144}{3}$ cm^2 (B) $\frac{154}{21} cm^2$

(C) $\frac{150}{7}$ cm^2 (D) $\frac{77}{3}$ cm^2

ANS : D

17. In a circle of radius radius 21 cm, an are subtends an angle of the centre. The area of the segment formed by the corresponding chord of the arc is

(A) 40.63 cm^2

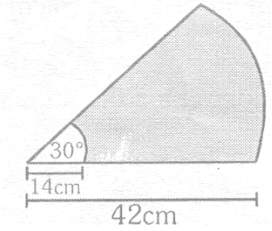
(B) 421.73 cm^2

(C) 429.43 cm^2

(D) 40.27 cm^2

ANS : D

18. AB and CD are respectively arcs of two concentric circles of radii 42 cm and 14 cm and centre O as shown in the adjoining figure. If $\angle AOB = 30^o$, then the area of the shaded region is



(A) $\frac{1232}{3} cm^2$

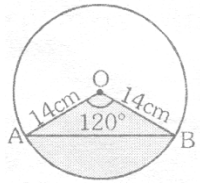
(B) $\frac{1220}{3} cm^2$

(C) 411cm^2

(D) None of these

ANS : A

19. In the given figure, the shaded area is



(A) 205.03 cm^2

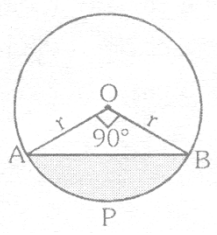
(B) 205.04 cm^2

(C) 205.33 cm^2

(D) 205.35 cm^2

ANS : C

20. In the given figure, the area of the segment APB is



(A) $\frac{1}{4}\pi r^2$

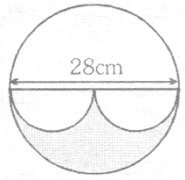
(B) $\frac{1}{4}(\pi - 2)r^2$

(C) $\frac{1}{4}(\pi-1)r^2$

(D) None of these

ANS : B

21. In the given figure, the area of shaded region is



(A) 462 cm²

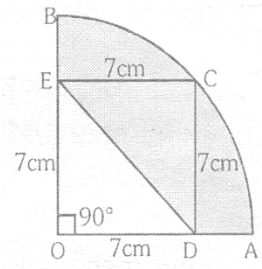
(B) 308 cm²

(C) 616 cm²

(D) 154 cm²

ANS : D

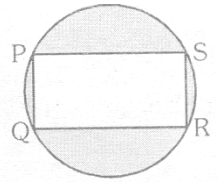
22. In the given figure, ODCE is a square then the area of shaded region is



(A) 52.5 cm² (B) 24.5 cm² (C) 49 cm² (D) None of these

ANS : A

23. In the adjoining figure PQRS is a rectangle 8 cm x 6 cm, inscribed in the circle. The area of the shaded portion will be :



(A) 48 cm²

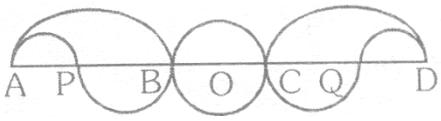
(B) 42.50 cm²

(C) 32.50 cm²

(D) 30.5 cm²

ANS : D

24. In the adjoining figure AB = CD = 2BC = 2BP = 2 CQ. In the middle, a circle with radius 1 cm is drawn. In the rest figure all are the semicircular arcs. What is the perimeter of the whole figure?



(A) 4 π

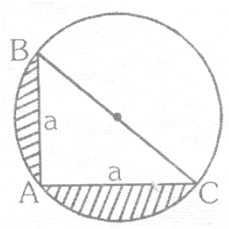
(B) 8 π

(C) 10 π

(D) None of these

ANS : C

25. If BC passes through centre of the circle, then the area of the shaded region in the given figure is



(A) $\frac{a^2}{2}(3-\pi)$

(B) $a^2\left(\frac{\pi}{2}-1\right)$

(C) $2a^2(\pi - 1)$

(D) $\frac{a^2}{2}\left(\frac{\pi}{2}-1\right)$

ANS : D

26. Two circles of unit radii, are so drawn that the centre of each lies on the circumference of the other. The area of the region common to both the circles, is :

(A) $\frac{(4\pi-3\sqrt{3})}{12}$ (B) $\frac{(4\pi-6\sqrt{3})}{12}$

(C) $\frac{(4\pi-3\sqrt{3})}{6}$ (D) $\frac{(4\pi-6\sqrt{3})}{6}$

ANS : C

27. The area of the largest possible square inscribed in a circle of unit radius (in square unit) is :

(A) 3 (B) 4 (C) $2\sqrt{3\pi}$ (D) 2

ANS : D

28. The area of the largest triangle that can be inscribed in a semicircle of radius r is:

(A) r^2 cm² (B) $\left(\frac{r}{3}\right)^2 cm^2$ (C) $r\sqrt{2}$ cm² (D) $3\sqrt{3r}$ cm²

ANS : A

29. If a regular hexagon is inscribed in a circle of radius r, then its perimeter is :

(A) $6\sqrt{3r}$ (B) 6r (C) 3r (D) 12r

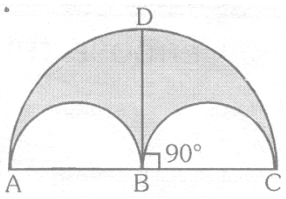
ANS : B

30. If a regular circumscribes a circle of radius r, then its perimeter is :

(A) $4\sqrt{3}r$ (B) $6\sqrt{3}r$ (C) 6r (D) $12\sqrt{3}r$

ANS : A

31. In the adjoining figure there are three semicircles in which BC = 6 cm and BD = $6\sqrt{3}$ cm. What is the area of the shaded region (in cm):



(A) 12 π

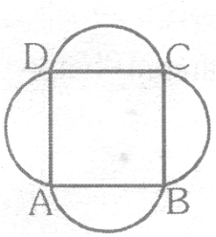
(B) 9 π

(C) 27 π

(D) 28 π

ANS : C

32. ABCD is a square of side a cm. AB, BC, CD and AD all are the chords of circles with equal radii each. It the chords subtends an angle of 120° at their respective centres, find the total area of the given figure, where arcs are part of the circles:



(A) $\left[a^2 + 4\left(\frac{\pi a^2}{9} - \frac{a^2}{3\sqrt{2}}\right)\right]$

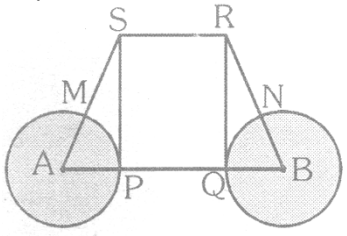
(B) $\left[a^2 + 4\left(\frac{\pi a^2}{9} - \frac{a^2}{4\sqrt{3}}\right)\right]$

(C) [$9a^2 - 4\pi + 3\sqrt{3a^2}$]

(D) None of these

ANS : B

33. In the adjoining figure PQRS is a square and MS = RN and A, P, Q and B lie on the same line. Find the ratio of the area of two circles to the area of the square. Given that AP = Ms.



(A) $\frac{\pi}{3}$

(B) $\frac{2\pi}{3}$

(C) $\frac{3\pi}{2}$

(D) $\frac{6}{\pi}$

ANS : B

34. What is the area of region 1?

(A) 2.4 cm^2 (B) $\left(2-\frac{\pi}{4}\right)cm^2$

(C) 8 cm^2 (D) (4π - 2) cm^2

ANS : C

35. What is the area of region 2?

(A) 3 (π - 2) cm^2 (B) (π - 3) cm^2 (C) (2 π - 3) cm^2 (D) 4 (π - 2) cm^2

ANS : D

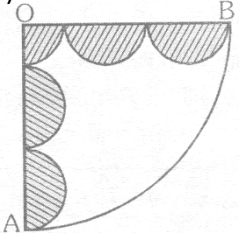
36 . What is the area of region 3?

(A) (4 – 4 π) cm^2 (B) 4 (4 - π) cm^2 (C) (4 π - 2) cm^2 (D) (3 π + 2) cm^2

ANS : B

37. A circular paper is folded along its diameter, then again it is folded to form a quadrant. Then it is cut as shown in the figure, after it the paper was reopened in the original circular shape. Find the ratio of the original paper to that of the remaining paper? (The shaded portion is cut off from the quadrant. The radius of quadrant OAB is 5 cm and radius of each semicircle is 1 cm) :

(A) 25 : 16 (B) 25 : 9 (C) 20 : 9 (D) None of these



ANS : A

38. What is the radius of the inner-most circle?

(A) $\frac{R}{2}$ (B) $\frac{R}{\sqrt{2}}$ (C) $\sqrt{2}R$ (D) None of these

ANS : A

39. What is the sum of areas of all the squares shown in the figure?

(A) $3R^2$ (B) $3\sqrt{2}R^2$ (C) $\frac{3}{\sqrt{2}}R^2$ (D) None of these

ANS : A

40. What is the ratio of sum of circumferences of all the circles to the sum of perimeters of all the squares?

(A) $(2+\sqrt{3})\pi R$ (B) $(3+\sqrt{2})\pi R$ (C) $3\sqrt{3}\pi R$ (D) None of these

ANS : D

41. What is the sum of perimeters of both the hexagons?

(A) $(2+\sqrt{3})R$ (B) $3(2+\sqrt{3})R$ (C) $3(3+\sqrt{2})R$ (D) None of these

ANS : B

42. What is the ratio of area of inner circle to the outer circle?

(A) 3 : 4 (B) 9 : 16 (C) 3 : 8 (D) None of these

ANS : A

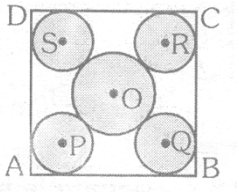
43. If there are some more circles and hexagons inscribed in the similar way as given above, then the ratio of each side of outermost hexagon (largest one) to that of the fourth (smaller one) hexagon is (fourth hexagon means the hexagon which is inside the third hexagon from the outerside.):

(A) 9 : $3\sqrt{2}$ (B) 16 : 9 (C) 8 : $3\sqrt{3}$ (D) None of these

ANS : C

44. In the adjoining diagram ABCD is a square with side ‘a’ cm. In the diagram the area of the larger circle with centre ‘O’ is equal to the sum of the areas of all the rest four circles with equal radii,

whose centres are P, Q, R, and S. What is the ratio between the side of square and radius of a smaller circle?



(A) ($2\sqrt{2}$ + 3) (B) (2 + $3\sqrt{2}$) (C) (4 + $3\sqrt{2}$) (D) Can't be determined.

ANS : B

45. There are two concentric circles whose areas are in the ratio of 9 : 16 and the difference between their diameters is 4 cm. What is the area of the outer circle?

(A) 32 cm^2 (B) 64 π cm^2 (C) 36 cm^2 (D) 48 cm^2

ANS : B

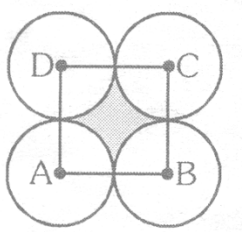
46. ABCD is a square, 4 equal circles are just touching each other whose centres are the vertices A, B, C, D of the square. What is the ratio of shaded to the unshaded area within square?

(A) $\frac{8}{11}$

(B) $\frac{3}{11}$

(C) $\frac{5}{11}$

(D) $\frac{6}{11}$



ANS : B

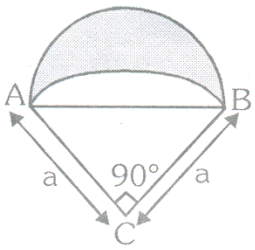
47. In the adjoining figure ACB is a quadrant with radius 'a'. A semicircle is drawn outside the quadrant taking AB as a diameter. Find the area of shaded region :

(A) $\frac{1}{4}(\pi - 2a^2)$

(B) $\left(\frac{1}{4}\right)(\pi a^2 - a^2)$

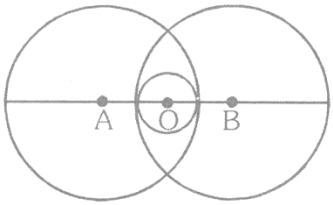
(C) $\frac{a^2}{2}$

(D) Can't be determined



ANS : C

48. There are two circles intersecting each other. Another smaller circle with centre O, is lying between the common region of two larger circles. Centre of the circle (i.e., A, O and B) are lying on a straight line. AB = 16 cm and the radii of the larger circles are 10 cm each. What is the area of the smaller circle?



(A) 4π cm²

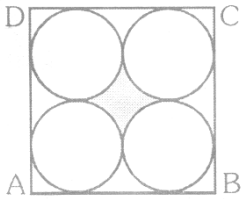
(B) 2π cm²

(C) $\frac{4}{\pi}$ cm²

(D) $\frac{\pi}{4}$ cm²

ANS : A

49. ABCD is a square, inside which 4 circles with radius 1 cm, each are touching each other. What is the area of the shaded region?



(A) $(2\pi - 3)$ cm²

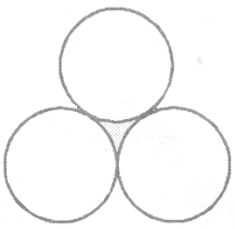
(B) $(4 - \pi)$ cm²

(C) $(16 - 4\pi)$ cm²

(D) None of these

ANS : B

50. Three circles of equal radii touch each other as shown in figure. The radius of each circle is 1 cm. What is the area of shaded region?



(A) $\left(\frac{2\sqrt{3}-\pi}{2}\right)$ cm²

(B) $\left(\frac{3\sqrt{2}-\pi}{3}\right)$ cm²

(C) $\frac{2\sqrt{3}}{\pi}$ cm²

(D) None of these

ANS : A

51. If the radii of two circles are 7 cm and 24 cm, then the radius of circle having area equal to the sum of the areas of the two circles, is :
(A) 31 cm (B) 25 cm (C) 17 cm (D) 28 cm

ANS : B

52. The cost of fencing a circular field at the rate of M24per metre is M5280. Then the cost of ploughing
the field, at the rate of 50 paise/m^2, is :
(A) M2875 (B) M3850 (C) M1925 (D) M1825

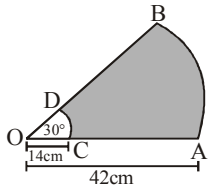
ANS : C

53. The area of a sector, of a circle with radius 7 cm and angle of the sector is 60°, is :

(A) $\frac{144}{3}cm^2$ (B) $\frac{154}{21}cm^2$ (C) $\frac{150}{7}cm^2$ (D) $\frac{77}{3}cm^2$

ANS : D

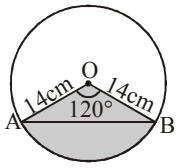
54. AB and CD are respectively arcs of two concentric circles of radii 42 cm and 14 cm and centre O as shown in the adjoining figure. If ∠AOB = 30°, then the area of the shaded region is :



(A) $\frac{1232}{3}cm^2$ (B) $\frac{1220}{3}cm^2$ $\frac{1220}{3}cm^2$ (C) 411 cm^2 (D) None of these

ANS : A

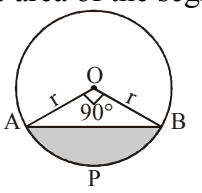
55. In the given figure, the shaded area is :



(A) 205.03 cm^2 (B) 205.04 cm^2 (C) 205.33 cm^2 (D) 205.35 cm^2

ANS : C

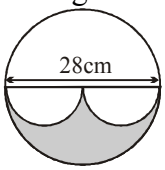
56. In the given figure, the area of the segment APB is :



(A) $\frac{1}{4}\pi r^2$ (B) $\frac{1}{4}(\pi-2)r^2$ (C) $\frac{1}{4}(\pi-1)r^2$ (D) None of these

ANS : B

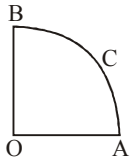
57 In the given figure, the area of shaded region is :



(A) 462 cm^2 (B) 308 cm^2 (C) 616 cm^2 (D) 154 cm^2

ANS : D

58 In the adjoining figure, OACB is a quadrant of a circle of radius 7 cm. Then perimeter of the quadrant is:



(A) 11 cm (B) 18 cm (C) 25 cm (D) 36 cm

ANS : C

59. The inner circumference of a circular track is 220 m, and the track is 14 m wide. The cost of levelling the track, at 50 paise/m^2, is

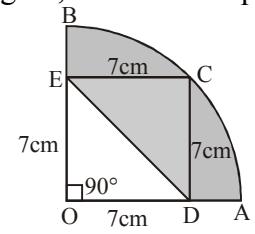
(A) M1848 (B) M1663.2 (C) M1478.4 (D) None of these

ANS : A

60. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. The area of the segment formed by the corresponding chord of the arc is
(A) 40.63 cm^2 (B) 421.73 cm^2 (C) 429.43 cm^2 (D) 40.27 cm^2

ANS : D

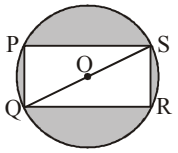
61. In the given figure, ODCE is a square then the area of shaded region is



(A) 52.5 cm^2 (B) 24.5 cm^2 (C) 49 cm^2 (D) None of these

ANS : A

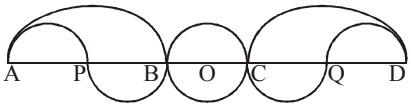
62. In the adjoining figure PQRS is a rectangle 8 cm × 6 cm, inscribed in the circle whose centre is O. The area of the shaded portion will be :



(A) 48 cm^2 (B) 42.50 cm^2 (C) 32.50 cm^2 (D) 30.5 cm^2

ANS : D

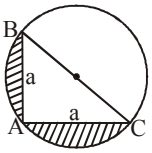
63. In the adjoining figure AB = CD = 2BC = 2BP = 2 CQ. In the middle, a circle with radius 1 cm is drawn. In the rest figure all are the semicircular arcs. What is the perimeter of the whole figure?



(A) 4 π (B) 8π (C) 10 π (D) None of these

ANS : C

64. If BC passes through centre of the circle, then the area of the shaded region in the given figure is :



(A) $\frac{a^2}{2}(3-\pi)$ (B) $a^2\left(\frac{\pi}{2}-1\right)$ (C) $2a^2(\pi-1)$ (D) $\frac{a^2}{2}\left(\frac{\pi}{2}-1\right)$

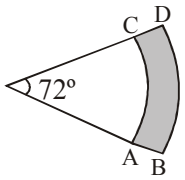
ANS : D

65. Two circles of unit radii, are so drawn that the centre of each lies on the circumference of theother.
The area of the region common to both the circles, is :

(A) $\frac{(4\pi-3\sqrt{3})}{12}$ (B) $\frac{(4\pi-6\sqrt{3})}{12}$ (C) $\frac{(4\pi-3\sqrt{3})}{6}$ (D) $\frac{(4\pi-6\sqrt{3})}{6}$

ANS : C

66. In the adjoining figure, O is the centre of a circle. If OA = 10 cm, OB = 15 cm and , then the area of the shaded region is



(A) 5 πcm^2 (B) 10 πcm^2 (C) 25 πcm^2 (D) 35 πcm^2

ANS : C

67. The area of the largest possible square inscribed in a circle of unit radius (in square unit) is :
(A) 3 (B) 4 (C) $2\sqrt{3}\pi$ (D) 2

ANS : D

68. The area of the largest triangle that can be inscribed in a semicircle of radius r is :

(A) r^2 cm^2 (B) $\left(\frac{r}{3}\right)^2 cm^2$ (C) $r\sqrt{2}\ cm^2$ (D) $3\sqrt{3r}\ cm^2$

ANS : A

69. If a regular hexagon is inscribed in a circle of radius r, then its perimeter is :
(A) $6\sqrt{3}r$ (B) 6r (C) 3r (D) 12r

ANS : B

70. If a regular hexagon circumscribes a circle of radius r, then its perimeter is :
(A) $4\sqrt{3}r$ (B) $6\sqrt{3}r$ (C) 6r (D) $12\sqrt{3}r$

ANS : A

71. In the adjoining figure, a circle is inscribed in a square of side 14 cm. The area of the shaded region is equal to

(A) 196 cm^2 (B) 154 cm^2 (C) 52 cm^2 (D*) 42 cm^2

ANS : D

72. The length of minute hand of a clock is 14 cm. The area swept by the minute hand in one minute is :

(A) 10.26 cm^2 (B) 10 cm^2 (C) 11 cm^2 (D) 11.25 cm^2

ANS : A

73. Circle Multiple Choice Question 1. The area of the circle is 154 cm2. The radius of the circle is

(A) 7 CM

(B) 14 CM

(C) 3.5 CM

D) 17.5 CM

ANS : A

74. If angle of sector is 60°, radius is 3.5 cm then length of the arc is

(A) 3 CM

(B) 3.5 CM

(C) 3.66 CM

(D) 3.8 CM

ANS : C

75. Areas Related To Circles MCQs Question 3. The area of a quadrant of a circle whose circumference is 22 cm, is

(a) $\frac{11}{8}$ cm^2 **(b)** $\frac{77}{2}$ cm^2 **(c)** $\frac{77}{4}$ cm^2 **(d)** $\frac{77}{8}$ cm^2

ANS : D

76. If 0 is the angle in degrees of a sector of a circle of radius V, then area of the sector is

(a) $\frac{\pi r^2\theta}{180}$ (b) $\frac{\pi r^2\theta}{360}$ (c) $\frac{2\pi r\theta}{180}$ (d) $\frac{2\pi r\theta}{360}$

ANS : B

77. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 7 m long rope. The area of that part of the field in which the horse can graze, is

(A) 77 CM² (B) 77/2 CM² (C) 154 CM² (D) 77/4 CM²

ANS :B

78. The area of the circle whose diameter is 21 cm is

(A) 346.5 CM²

(B) 37.68 CM²

(C) 18.84 CM²

(D) 19.84 CM²

ANS : A

79. The area of the sector of a circle with radius 6 cm and of angle 60° is

(A) 9.42 CM²

(B) 37.68 CM²

(C) 18.84 CM²

(D) 19.84 CM²

ANS : C

SOL: Here r = 6 cm, θ = 60°

Area of the sector = θ360

∴ Area = 60/360 × 3.14 × 6 × 6 = 1/6 × 3.14 × 6 × 6 = 3.14 × 6 = 18.84 cm²

80. The area of a circle whose circumference is 22 cm, is

(A) 11 CM² (B) 38.5 CM² (C) 22 CM² (D) 77 CM²

ANS : B

81. The area of a circle is 154 cm2. Its diameter is

(A) 7 CM (B) 14 CM (C) 21 CM (D) 28 CM

ANS :B

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

(A) 153.9 CM^2 (B) 102.6 CM^2 (C) 51.3 CM^2 (D) 205.2 CM^2

ANS : C

SOL : Angle swept by the minute hand in 1 minute = (360° ÷ 60) = 6°

∴ θ = 30°

∴ Angle swept by the minute hand in 5 minutes = 6° × 5 = 30°

Length of minute hand (r) = 14 cm

∴ Area swept = $\theta/360\pi r^2 = 30/360 \times 22/7 \times 14 \times 14 = 154/3 = 51.3\ cm^2$

83. MCQ Questions For Class 10 Maths Areas Related To Circles Question 11. The radii of two circles are 19 cm and 9 cm respectively. The radius of the circle which has circumference equal to the sum of the circumference of two circles is

(A) 35 CM (B) 10 CM (C) 21 CM (D) 28 CM

ANS : D

84. The area of the circle that can be inscribed in a square of side 6 cm, is

(A) 18Π CM^2 (B) 12Π CM^2 (C) 9Π CM^2 (D) 14Π CM^2

ANS : C

85. The radii of two circles are 4 cm and 3 cm respectively. The diameter of the circle having area equal to the sum of the areas of the two circles (in cm) is [Delhi 2011]

(A) 5 (B) 7 (C) 10 (D) 14

ANS : C

86. MCQ on Area Related To Circles Class 10 Question 14. The perimeter (in cm) of a square circumscribing a circle of radius a cm, is [AI2011]

(A) 8 A (B) 4 A (C) 2 A (D) 16 A

ANS : A

87. If the area of a circle is numerically equal to twice its circumference, then the diameter of the circle is

(A) 4 UNITS (B) N UNITS (C) 8 UNITS (D) 2 UNITS

ANS : C

88. If the circumference of a circle is 352 metres, then its area in square metres is

(A) 5986 (B) 6589 (C) 7952 (D) 9856

ANS : D

89. Area Related To Circle Class 10 MCQ Question 17. The diameter of a wheel is 1.26 m. The distance travelled in 500 revolutions is

(A) 2670 M (B) 2880 M (C) 1980 M (D) 1596 M

ANS : C

SOL: Radius of the wheel = 1.26/2 = 0.63 m

Distance travelled in one revolution

$= 2\pi r = 2 \times 22/7 \times 0.63$

= 3.96 m

∴ Distance travelled in 500 revolutions

$= 500 \times 3.96$

= 1980 m.

90. If the sum of the circumferences of two circles with radii Rj and R2 is equal to the circumference of a circle of radius R, then [NCERT Exemplar Problems]

(A) R1 + R2 = R

(B) R1 + R2 > R

(C) R1 + R2 < R

(D) nothing definite can be said about the relation among Rp1, R2 and R.

ANS : A

91. If the circumference of a circle and the perimeter of a square are equal, then [NCERT Exemplar Problems]

(A) area of the circle = area of the square

(B) area of the circle > area of the square

(C) area of the circle < area of the square

(D) nothing definite can be said about the relation between the areas of the circle and square.

ANS : B

92. MCQ on Area Related To Circles Question 20. Area of the largest triangle that can be inscribed in a semi-circle of radius r units is [NCERT Exemplar Problems]

(A) R^2 SQ. UNITS

(B) 1/2 R^2 SQ. UNITS

(C) 2 R^2 SQ. UNITS

(D) $\sqrt{2}$ R^2 SQ. UNITS

ANS : A

93.. Match the columns

1. Area of quadrant	(A) $\frac{1}{2}\pi r^2$
2. Area of equilateral triangle	(B) $\frac{\sqrt{3}}{4} \times \text{side}^2$
3. Area of semicircle	(C) $\frac{\sqrt{3}}{2}\text{side}^2$
4. Perimeter of semicircle	(D) $\frac{1}{4}\pi r^2$
	(E) πr
	(F) $\pi r + 2r$

(A) 1 → A, 2 → C, 3 → D, 4 → E

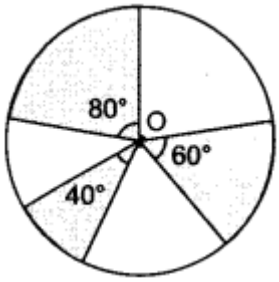
(B) 1 → B, 2 → C, 3 → F, 4 → E

(C) 1 → D, 2 → B, 3 → A, 4 → F

(D) 1 → D, 2 → B, 3 → E, 4 → F

ANS : C

94.. In the given figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centre are shaded. The area of the shaded region (in cm2) is [Using π = 22/7]



(A) 77 (B) 154 (C) 44 (D) 22

ANS : A

95. Areas Related To Circles Question 23. If the difference between the and the radius of of a circle is 37 cm, then 22 using π = 22/7 the circumference (in cm) of the circle is:

(A) 154 (B) 44 (C) 14 (D) 7

ANS :B

96. If 7i is taken as 22/7, the distance (in metres) covered by a wheel of diameter 35 cm, in one revolution, is

(A) 2.2 (B) 1.1 (C) 9.625 (D) 96.25

ANS : B

97. Circle MCQ Pdf Question 25. If the circumferences of two circles are in the ratio 4 : 9, then the ratio in their area is

(A) 9 : 4 (B) 4 : 9 (C) 2 : 3 (D) 16 : 81

ANS : D

98. The ratio of the areas of the incircle and circumcircle of a square is

(A) 1 : 2 (B) 1 : 3 (C) 1 : 4 (D) 1 : √2

ANS : A

99. A circular wire of radius 42 cm is cut and bent into the form of a rectangle whose sides are in the ratio of 6 : 5. The smaller side of the rectangle is

(A) 30 CM (B) 60 CM (C) 70 CM (D) 80 CM

ANS : B

100. Match the columns.

1. Area of sector	(A) $\frac{1}{2}\pi r^2$
2. Perimeter of sector	(B) $\frac{\theta}{360^\circ}.\pi r^2$
3. Area of major segment	(C) Area of circle – area of minor segment
4. Perimeter of minor segment	(D) $2r$ + length of arc
	(E) Length of arc + length of corresponding chord.

(A) 1 → B, 2 → C, 3 → D, E → 4(B) 1 → B, 2 → D, 3 → C, E → 4

(C) 1 → A, 2 → C, 3 → D, E → 4(D) 1 → B, 2 → C, 3 → D, E → 4

ANS : B