CHAPTER 12

Areas Related to Circles

1. OBJECTIVE QUESTIONS

1. The area of a circular ring formed by two concentric circles whose radii are 5.7 cm and 4.3 cm respectively is (Take $\pi = 3.1416$)

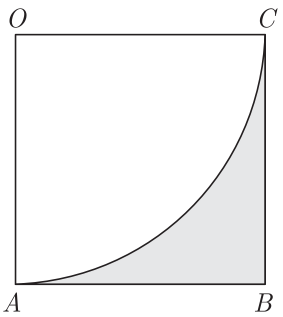
(a) 43.98 sq. cm. (b) 53.67 sq. cm.
(c) 47.24 sq. cm. (d) 38.54 sq. cm.

Ans : (a) 43.98 sq. cm.

Let the radii of the outer and inner circles be r_1 and r_2 respectively, we have

$$\begin{aligned} \text{Area} &= \pi r_1^2 - \pi r_2^2 = \pi(r_1^2 - r_2^2) \\ &= \pi(r_1 - r_2)(r_1 + r_2) \\ &= \pi(5.7 - 4.3)(5.7 + 4.3) \\ &= \pi \times 1.4 \times 10 \text{ sq. cm} \\ &= 3.1416 \times 14 \text{ sq. cm.} \\ &= 43.98 \text{ Sq. Cm.} \end{aligned}$$

2. In the adjoining figure, $OABC$ is a square of side 7 cm. OAC is a quadrant of a circle with O as centre. The area of the shaded region is



(a) 10.5 cm^2 (b) 38.5 cm^2
(c) 49 cm^2 (d) 11.5 cm^2

Ans : (a) 10.5 cm^2

$$\begin{aligned} \text{Required area} &= \left(7^2 - \frac{1}{4} \times \frac{22}{7} \times 7^2\right) \text{cm}^2 \\ &= (49 - 38.5)\text{cm}^2 \end{aligned}$$

3. A sector is cut from a circular sheet of radius 100 cm, the angle of the sector being 240°. If another circle of the area same as the sector is formed, then radius of the new circle is

(a) 79.5 cm (b) 81.5 cm
(c) 83.4 cm (d) 88.5 cm

Ans : (b) 81.5 cm

$$\begin{aligned} \text{Area of sector} &= 240/360 \times \pi(100)^2 \\ &= 20933 \text{ cm}^2 \end{aligned}$$

Let r be the radius of the new circle, then

$$\begin{aligned} 20933 &= \pi r^2 \\ r &= \sqrt{\frac{20933}{\pi}} = 81.6 \text{ cm} \end{aligned}$$

4. 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 m^2 (b) 1576 m^2
(c) 1694 m^2 (d) 3368 m^2

Ans : (c) 1694 m^2

Radius of outer concentric circle

$$= (35 + 7) \text{ m} = 42 \text{ m.}$$

$$\begin{aligned} \text{Area of path} &= \pi(42^2 - 35^2) \text{ m}^2 \\ &= \frac{22}{7}(42^2 - 35^2) \text{ m}^2 \end{aligned}$$

5. If the area of a semi-circular field is 15400 sq m, then perimeter of the field is:

(a) $160\sqrt{2}$ m (b) $260\sqrt{2}$ m
(c) $360\sqrt{2}$ m (d) $460\sqrt{2}$ m

Ans : (c) $360\sqrt{2}$ m

Let the radius of the field be r.

$$\begin{aligned} \text{Then,} \quad \frac{\pi r^2}{2} &= 15400 \\ \frac{1}{2} \times \frac{22}{7} \times r^2 &= 15400 \\ r^2 &= 15400 \times 2 \times \frac{7}{22} \\ &= 9800 \\ r &= 70\sqrt{2} \text{ m} \end{aligned}$$

Thus, perimeter of the field

$$\begin{aligned} &= \pi r + 2r \\ &= \frac{22}{7} \times 70\sqrt{2} + 2 \times 70 \times \sqrt{2} \end{aligned}$$

$$= 220\sqrt{2} + 140\sqrt{2}$$
$$= \sqrt{2}(220 + 140)$$
$$= 360\sqrt{2}\,\text{m}$$

6. The area of a sector of angle p (in degrees) of a circle with radius R is

(a) $\frac{p}{360} \times 2\pi R$ (b) $\frac{p}{180} \times \pi R^2$

(c) $\frac{p}{720} \times 2\pi R$ (d) $\frac{p}{720} \times 2\pi R^2$

Ans : (d) $\frac{p}{720} \times 2\pi R^2$

7. If the sector of a circle of diameter 10 cm subtends an angle of 144° at the centre, then the length of the arc of the sector is

(a) 2π cm (b) 4π cm

(c) 5π cm (d) 6π cm

Ans : (b) 4π cm

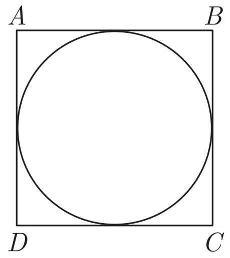
8. The area of the circle that can be inscribed in a square of side 6 cm is:

(a) 36π cm^2 (b) 18π cm^2

(c) 12π cm^2 (d) 9π cm^2

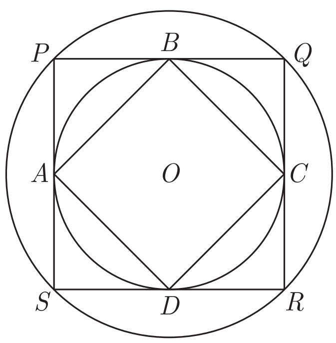
Ans : (d) 9π cm^2

Given, side of square $= 6$ cm



$$\text{Diameter of a circle, } (d) = \text{Side of square} = 6\text{ cm}$$
$$\text{Radius of a circle } (r) = \frac{d}{2} = \frac{6}{2} = 3\text{ cm}$$
$$\text{Area of circle} = \pi(r)^2$$
$$= \pi(3)^2 = 9\pi\text{ cm}^2$$

9. The figure below shows two concentric circles with centre O. $PQRS$ is a square inscribed in the outer circle. It also circumscribes the inner circle, touching it at point B, C, D and A. The ratio of the perimeter of the outer circle to that of polygon $ABCD$ is



(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{2}$

(c) $\frac{\pi}{2}$ (d) π

Ans : (c) $\frac{\pi}{2}$

Joining B to O and C to O

Let the radius of the outer circle be r

Hence, Perimeter $= 2\pi r$

But $OQ = BC$

$= r$

[diagonals of the square BQCO]

Perimeter of $ABCD = 4$ r.

Hence, ratio $= \frac{2\pi r}{4r} = \frac{\pi}{2}$

10. The sum of the areas of two circle, which touch each other externally, is 153π. If the sum of their radii is 15, then the ratio of the larger to the smaller radius is

(a) 4 : 1 (b) 2 : 1

(c) 3 : 1 (d) None of these

Ans : (a) 4 : 1

Let the radii of the two circles be r_1 and r_2, then

$$r_1 + r_2 = 15 \text{ (given)} \quad ...(1)$$

and
$$\pi r_1^2 + \pi r_2^2 = 153\pi \text{ (given)} \quad ...(2)$$
$$r_1^2 + r_2^2 = 153$$
$$r_1^2 + (15 - r_1^2) = 153$$

On solving, we get

$$r_1 = 12$$
$$r_2 = 3$$
$$\text{Required ratio} = 12 : 3 = 4 : 1$$

11. A race track is in the form of a ring whose inner and outer circumference are 437 m and 503 m respectively. The area of the track is

(a) 66 sq. cm. (b) 4935 sq. cm.

(c) 9870 sq. cm (d) None of these

Ans : (b) 4935 sq. cm.

$$2\pi r_1 = 503$$

and
$$2\pi r_2 = 437$$
$$r_1 = \frac{503}{2\pi}$$

and
$$r_2 = \frac{437}{2\pi}$$

$$\text{Area of ring} = \pi(r_1 + r_2)(r_1 - r_2)$$
$$= \pi\left(\frac{503 + 437}{2\pi}\right)\left(\frac{503 - 437}{2\pi}\right)$$
$$= \frac{940}{2}\left(\frac{66}{2\pi}\right) = 235 \times \frac{66}{2} \times 7$$
$$= 235 \times 21 = 4935\text{ sq. cm.}$$

12. If the sum of the circumferences of two circles with diameters d_1 and d_2 is equal to the circumference of a circle of diameter d, then

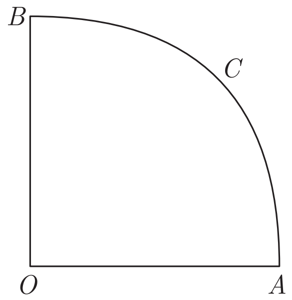
(a) $d_1^2 + d_2^2 = d^2$ (b) $d_1 + d_2 = d$

(c) $d_1 + d_2 > d$ (d) $d_1 + d_2 < d$

Ans : (b) $d_1 + d_2 = d$

$$\pi d_1 + \pi d_2 = \pi d$$
$$d_1 + d_2 = d$$

13. In the adjoining figure, $OACB$ is a quadrant of a circle of radius 7 cm. The perimeter of the quadrant is



(a) 11 cm (b) 18 cm
(c) 25 cm (d) 36 cm

Ans : (c) 25 cm

$$\text{Perimeter} = \frac{1}{4} \times 2\pi r + 2r$$
$$= \left(\frac{1}{2} \times \frac{22}{7} \times 7 + 2 \times 7\right) \text{cm} = 25 \text{ cm}$$

14. If the circumference of a circle increases from 4π to 8π, then its area is
(a) halved (b) doubled
(c) tripled (d) quadrupled

Ans : (d) quadrupled

$$2\pi r = 4\pi$$
$$r = 2$$
$$\text{Area} = \pi(2)^2 = 4\pi$$

When, $2\pi r = 8\pi$
$$r = 4$$
$$\text{Area} = 16\pi$$

15. If the radius of a circle is diminished by 10%, then its area is diminished by
(a) 10% (b) 19%
(c) 36% (d) 20%

Ans : (b) 19%
Let r be the radius of circle area $= \pi r^2$
When r is diminished by 10%

Then, $\text{area} = \pi\left(r - \frac{r}{10}\right)^2$
$$= \pi r^2\left(\frac{81}{100}\right)$$

Thus area is diminished by
$$\left(1 - \frac{81}{100}\right)\% = 19\%$$

16. If the perimeter of a semi-circular protractor is 36 cm, then its diameter is
(a) 10 cm (b) 14 cm
(c) 12 cm (d) 16 cm

Ans : (b) 14 cm.

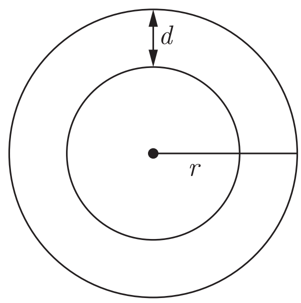
$$\text{Perimeter} = \frac{2\pi r}{2} + 2r$$
$$= \pi r + 2r$$
$$(\pi + 2)r = 36$$
$$\left(\frac{36}{7}\right) - r = 36$$
$$r = 7 \text{ cm}$$

Hence, $\text{diameter} = 7 \times 2 = 14 \text{ cm}$

17. The area of a cirular path of uniform width 'd' surrounding a circular region of radius 'r' is
(a) $\pi d(2r + d)$ (b) $\pi(2r + d)r$
(c) $\pi(d + r)d$ (d) $\pi(d + r)r$

Ans : (a) $\pi d(2r + d)$

$$\text{Required area} = \pi\left[(r + d)^2 - r^2\right]$$

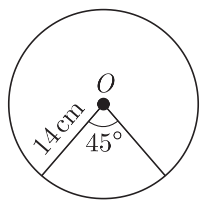


$$= \pi[r^2 + d^2 + 2rd - r^2]$$
$$= \pi[d^2 + 2rd] = \pi d[d + 2r]$$

18. In a circle of radius 14 cm, an arc subtends an angle of $45°$ at the centre, then the area of the sector is:
(a) 71 cm^2 (b) 76 cm^2
(c) 77 cm^2 (d) 154 cm^2

Ans : (c) 77 cm^2

Given, $r = 14 \text{ cm}$
and $\theta = 45°$



Since, $\text{Area of sector} = \frac{\theta}{360°} \times \pi r^2$
$$= \frac{45°}{360°} \times \frac{22}{7} \times 14 \times 14$$
$$= \frac{1}{8} \times 22 \times 2 \times 14$$
$$= 77 \text{ cm}^2$$

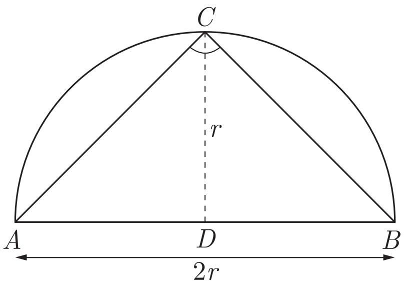
19. Area of the largest triangle that can be inscribed in a semi-circle of radius r units is:
(a) r^2 sq units (b) $\frac{1}{2}r^2$ sq units
(c) $2r^2$ sq units (d) $\sqrt{2}\,r^2$ sq units

Ans : (a) r^2 sq units
Take a point C on the circumference of the semi-circle

and join it by the end points of diameter A and B.

Hence, $\angle C = 90^\circ$ [by property of circle]
[angle in a semi – circle are right angle]

So, ΔABC is right angled triangle.



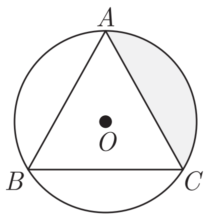
Hence, Area of largest triangle,

$$\Delta ABC = \frac{1}{2} \times AB \times CD$$

$$= \frac{1}{2} \times 2r \times r$$

$$= r^2 \text{ sq units}$$

20. In the given figure, ABC is an equilateral triangle inscribed in a circle of radius 4 cm with centre O, then the area of the shaded region is:



(a) $\frac{5}{3}(5\pi - 3\sqrt{3})\text{ cm}^2$ (b) $\frac{4}{3}(4\pi - 3\sqrt{3})\text{ cm}^2$

(c) $\frac{2}{3}(2\pi - \sqrt{3})\text{ cm}^2$ (d) $\frac{7}{3}(7\pi - 3\sqrt{3})\text{ cm}^2$

Ans : (b) $\frac{4}{3}(4\pi - 3\sqrt{3})\text{ cm}^2$

We have, $R = 4\text{ cm}$

Hence, $AB = BC = CA = R\sqrt{3} = 4\sqrt{3}$

$$\left[\text{Since, } R = \frac{2}{3}h \text{ and } h = \frac{\sqrt{3}}{2}a; \text{Hence, } R = \frac{a}{\sqrt{3}}\right]$$

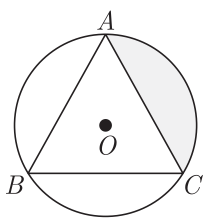
$$\angle AOC = 2\angle ABC$$

$$= 2 \times 60^\circ$$

$$= 120^\circ$$

Hence, Required area

$$= \frac{1}{3}(\text{Area of the circle} - \text{Area of } \Delta ABC)$$



$$\text{Required area} = \frac{1}{3}\left\{\pi R^2 - \frac{\sqrt{3}}{4} \times (\text{Side})^2\right\}$$

$$= \frac{1}{3}\left\{16\pi - \frac{\sqrt{3}}{4} \times (4\sqrt{3})^2\right\}$$

$$= \frac{1}{3}(16\pi - 12\sqrt{3})$$

$$= \frac{4}{3}(4\pi - 3\sqrt{3})\text{ cm}^2$$

2. FILL IN THE BLANK

1. Length of arc of a sector angle 45° of circle of radius 14cm is ....

Ans : $\frac{7}{2}\pi$cm

2. The boundary of a sector consists of an arc of the circle and the two ....

Ans : radii

3. .... is the region between the arc and two radii.

Ans : sector

4. The region enclosed by an arc and a chord is called the .... of the circle.

Ans : segment

5. Perimeter of a semi circle ....

Ans : $(\pi r + d)$ units

6. Circumference of a circle is ....

Ans : $2\pi r$

7. If radius of a circle is 14 cm the area of the circle is ....

Ans : 616 cm^2

8. Area of a circle is ....

Ans : πr^2

9. Measure of angle in a semi circle is ....

Ans : 90°

10. Length of an arc of a sector of a circle with radius r and angle with degree measure θ is ....

Ans : $\frac{\theta}{360} \times 2\pi r$

11. A sector of a circle is called a .... sector if the minor arc of the circle is a part of its boundary.

Ans : minor

12. Angle formed by two radii at the centre is known as ....

Ans : central angle

13. Concentric circles are circles having same..........

Ans : centre

14. The area of a circle is the measurement of the region

enclosed by its ....
Ans : boundary

15. Segment is the region enclosed between chord and ....
Ans : arc

16. If the area of a circle is 154 cm^2, then its circumference is ....
Ans : 44 cm

17. Pie (π) is the ratio between circumference and .... of the circle.
Ans : diameter

18. Area of a sector of a circle with radius 6 cm if angle of the sector is $60°$, is ....
Ans : $132/7$ cm^2

19. $2\pi r$ is .... of a circle.
Ans : circumference

3. TRUE/FALSE

1. If a sector of a circle of diameter 21 cm subtends an angle of $120°$ at the centre, then its area is 85.5 cm^2.
Ans : False

2. In a circle of radius 21 cm, an arc substends an angle of $60°$ the centre the length of the arc is 22 cm.
Ans : True

3. Area of a segment of a circle is less than the area of its corresponding sector.
Ans : False

4. A minor sector has an angle 'θ' substended at the centre of the circle, whereas major sector has no angle.
Ans : True

5. Two circles are congruent if their radii are equal.
Ans : True

6. The perimeter of a circle is generally known as its circumference.
Ans : True

7. If circumferences of two circles are equal, then their areas are also equal.
Ans : True

8. Distance moved by a rotating wheel in one revolution is equal to the circumference of the wheel.
Ans : True

9. The area of the circle inscribed in a square of side a cm, is πa^2 cm^2.
Ans : False

10. A segment corresponding a major arc of a circle is known as the major segement.
Ans : True

11. Distance travelled by a circular wheel of diameter d cm in one revolution in $2\pi d$ cm.
Ans : False

12. The numerical value of the area of a circle is greater than the numerical value of its circumference.
Ans : False

13. The length of a rope by which a cow must be techered in order that it may be able to graze of an area of 616 cm^2 is 18 m.
Ans : False

14. The areas of two sectors of two different circles with equal corresponding arc lengths are equal.
Ans : False

15. The perimeter of a square circumscribing a circle of radius a cm, is $8a$ cm.
Ans : True

16. If the boundary of a segment is a minor arc of a circle then the corresponding segment is called a minor segement.
Ans : True

17. The length of an arc of a sector of a circle of radius r units and of centre angle θ is $\frac{\theta}{360°} \times \pi r^2$
Ans : False

18. The area of the largest circle that can be drawn inside a rectangle of length a cm and breadth b cm $(a > b)$ is $\frac{\pi b^2}{4}$ cm^2.
Ans : True

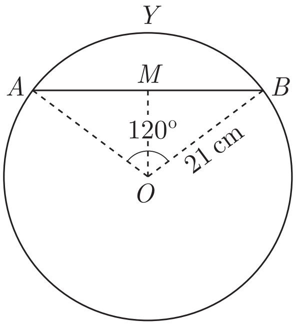
19. If the circumference of a circle is 88 cm, then its radius is 14 cm.
Ans : True

20. If diameter of a circle is p cm, then area of square inscribed in it is p^2 cm^2.
Ans : False

4. MATCHING QUESTIONS

DIRECTION : Each question contains statements given in two coloumns which have to be matched. Statements (A, B, C, D) in Column-I have to be matched with statements (p, q, r, s...) in Column-II.

1. For circle shown, match the column.



	Column-I		Column-II
(A)	Area of segment AYB	(p)	$\frac{441}{4}\sqrt{3}$
(B)	Area of sector $OAYB$	(q)	$\frac{21}{4}(88-21\sqrt{3})$
(C)	Area of $\Delta\ OAB$	(r)	462
(D)	OM	(s)	21/2

Ans : (A) – q, (B) – r, (C) – p, (D) – s.

2. Two circular flower beds have been shown on two sides of a square lawn $ABCD$ of side 56 m. If the centre of each circular flowered bed is the point of interesection O of the diagonals of the square lawn, then match the column.

	Column-I		Column-II
(A)	Area of $\Delta\ OAB$	(p)	4032
(B)	Area of flower bed	(q)	784
(C)	Area of sector OAB	(r)	448
(D)	Total area	(s)	1232

Ans : (A) – q, (B) – r, (C) – s, (D) – p.

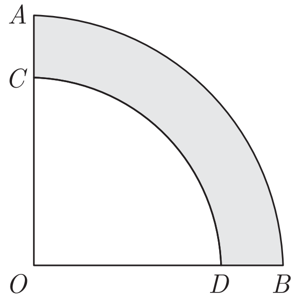
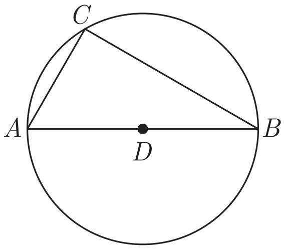
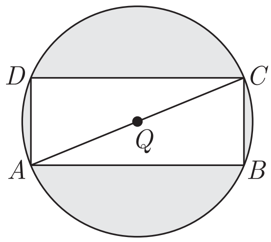
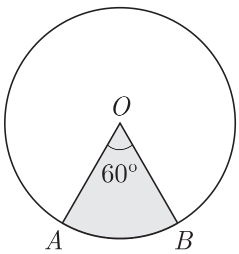
3.

	Column-I		Column-II
(A)	Circumference	(p)	$2r+\frac{\theta}{360}\times 2\pi r$
(B)	Area of a quadrant	(q)	$\frac{\theta}{360}\times\pi r^2$
(C)	Length of the arc of the secotr	(r)	$\frac{\pi r^2}{4}$
(D)	Perimeter of the sector	(s)	$\frac{\theta}{360}\times 2\pi r$
Area of the sector		(t)	$2\pi r$

Ans : (A) – t, (B) – r, (C) – s, (D) – p, (E) – q.

DIRECTION : Following questions has four statements (A, B, C and D) givne in Column I and five statements (p, q, r, s, t) in Column-II. Any given statement in Colunm-I can have correct matching with one or more statement (s) given in Column-II.

4.

	Column-I		Column-II
(A)	 $OA=26$ m, $OC=23$ m Area of shaded region = ?	(p)	30 cm^2
(B)	 $AD=6.5$ cm, $CA=5$ cm Area of $\Delta\ ABC=$?	(q)	115 m^2
(C)	 $BC=6$ cm, $AB=8$ cm Area of the shaded region = ?	(r)	35 cm^2
(D)	 $OB=14.8$ m Area of the shaded region = ?	(s)	0.003 m^2
		(t)	30 m^2

Ans : (A) – q, (B) – (p, s), (C) – (p, s), (D) – q

1. Area of the shaded region

$$=\frac{90}{360}\pi[(26)^2-(23)^2]$$

$$=\frac{1}{4}\times\frac{22}{7}[(26)^2-(23)^2]$$

$$= 115.5 \simeq 115 \text{ m}^2$$

2. $$AB = 2 \times AD$$
$$= 2 \times 6.5 = 13 \text{ cm}$$
$$BC = \sqrt{(AB)^2 - (AC)^2}$$
$$= \sqrt{(13)^2 - (5)^2}$$
$$= 12 \text{ cm}$$
$$\text{Area}(\triangle ABC) = \frac{1}{2} \times AC \times BC$$
$$= \frac{1}{2}(5)(12) = 30 \text{ cm}^2$$
$$= 0.003 \text{ m}^2$$

3. $$(AC)^2 = (AB)^2 + (BC)^2$$
$$= 64 + 36 = 100$$
$$AC = 10 \text{ cm}$$
Area of the shaded region
$$= (\text{area of the circle})$$
$$-(\text{area of the ABCD})$$
$$= \left[\frac{22}{7} \times \left(\frac{10}{2}\right)^2\right] - (8 \times 6)$$
$$= (78.57 - 48)$$
$$= 30.57 \text{ cm}^2$$

4. Area of the shaded region
$$= \frac{60}{360} \times \frac{22}{7} \times (14.8)^2$$
$$= 114.7 \simeq 115 \text{ m}^2$$

5. ASSERTION AND REASON

DIRECTION : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

1. **Assertion :** In a circle of radius 6 cm, the angle of a sector $60°$. Then the area of the sector is $18\frac{6}{7}\text{cm}^2$.

Reason : Area of the circle with radius r is πr^2.

Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

$$\text{Area of the sector} = \frac{\theta}{360} \times \pi r^2$$
$$= \frac{60}{360} \times \frac{22}{7} \times 6 \times 6$$
$$= \frac{132}{7} = 18\frac{6}{7}\text{cm}^2.$$

2. **Assertion :** If the circumference of a circle is 176 cm, then its radius is 28 cm.

Reason : Circumference $= 2\pi \times$ radius

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Both assertion and reason are correct. Also Reason is the correct explanation of the assertion.

$$C = 2 \times \frac{22}{7} \times r = 176$$
$$r = \frac{176 \times 7}{2 \times 22} = 28 \text{ cm}$$

3. **Assertion :** The length of the minute hand of a clock is 7cm. Then the area swept by the minute hand in 5 minutes is $12\frac{5}{6}\text{cm}^2$

Reason : The length of an arc of a sector of angle θ and radius r is given by $l = \frac{\theta}{360} \times 2\pi r$

Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Area swept by minute hand in 5 minutes
$$= \frac{\theta}{360} \times \pi r^2 = \frac{30}{360} \times \frac{22}{7} \times 7 \times 7$$
$$= \frac{77}{6} = 12\frac{5}{6} \text{ cm}^2$$
(Angle in 5 minutes by minute hand is $30°$)

4. **Assertion :** A wire is looped in the form of a circle of radius 28 cm. It is bent into a square. Then the area of the square is 1936 cm^2.

Reason : Angle described by a minute hand in 60 minutes$= 360°$.

Ans : (d) Assertion (A) is false but reason (R) is true.

We have, $$2\pi r = \text{length of wire}$$
$$2 \times \frac{22}{7} \times 28 = \text{length of wire}$$
$$\text{length of wire} = 176\text{cm}$$
Now, $$\text{perimeter of square} = 176$$
$$4a = 176$$
$$a = 44$$
$$\text{Area of square} = (44)^2 = 1936 \text{ cm}^2$$

5. **Assertion :** If the outer and inner diameter of a circular path is $10\,m$ and $6\,m$ then area of the path is $16\pi\,m^2$.

Reason : If R and r be the radius of outer and inner circular path $= \pi(R^2 - r^2)$.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Both assertion and reason are correct. Also, Reason is the correct explanation of the assertion.

$$\text{Area of the path} = \pi\left[\left(\frac{10}{2}\right)^2 - \left(\frac{6}{2}\right)^2\right]$$
$$= \pi(25 - 9) = 16\,\pi$$

6. **Assertion :** A bicycle wheel makes 5000 revolutions in covering 11 km. Then diameter of the wheel is 35 cm.

Reason : Area of segment of a circle is

$\frac{\theta}{360} \times \pi r^2 - \frac{1}{2} r^2 \sin\theta$

Ans : (d) Assertion (A) is false but reason (R) is true.

We have,

$$2\pi r = \frac{11000}{5000} = \frac{11}{5}\text{m} = \frac{11}{5} \times 100 \text{ cm}$$

$$2r = \frac{11 \times 100}{5 \times \pi} = \frac{11 \times 20}{22} \times 7$$

$$2r = 70$$

$$\text{Diameter} = 70 \text{ cm}$$

7. **Assertion :** If a wire of length 22 cm is bent in the shape of a circle, then area of the circle so formed is 40 cm^2.

Reason : Circumference of the circle = length of the wire.

Ans : (d) Assertion (A) is false but reason (R) is true.

Assertion is not correct, but reason is true.

$$2\pi r = 22$$

$$r = 3.5 \text{ cm}$$

$$\text{Area of the circle} = \frac{22}{7} \times 3.5 \times 3.5 = 38.5 \text{ cm}^2$$

8. **Assertion :** If the circumference of two circles are in the ratio 2 : 3 then ratio of their areas is 4 : 9.

Reason : The circumference of a circle of radius r is $2\pi r$ and its area is πr^2.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Given, $$\frac{2\pi r_1}{2\pi r_2} = \frac{2}{3}$$

$$\frac{r_1}{r_2} = \frac{2}{3}$$

Now, ratio of their areas be

$$\frac{\pi r_1^2}{\pi r_2^2} = \frac{r_1^2}{r_2^2} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

Also, circumference of circle $= 2\pi r$.