1. Find the area and perimeter of the circles with the following:
(i) Radius = 2.8 cm
(ii) Radius = 10.5 cm
(iii) Diameter = 77 cm
(iv) Diameter = 35 cm
Solution:-
(i)
From the question it is given that, radius of circle, r = 2.8 cm
We know that, Area of the circle = πr^2

$$= (22/7) \times (2.8)^2$$
$$= 24.64 \text{ cm}^2$$

Then, perimeter of the circle = $2\pi r$

$$= 2 \times (22/7) \times (2.8)$$
$$= 17.6 \text{ cm}$$

(ii)
From the question it is given that, radius of circle, r = 10.5 cm
We know that, Area of the circle = πr^2

$$= (22/7) \times (10.5)^2$$
$$= 346.5 \text{ cm}^2$$

Then, perimeter of the circle = $2\pi r$

$$= 2 \times (22/7) \times (10.5)$$
$$= 66 \text{ cm}$$

(iii)
From the question it is given that, diameter of circle, d = 77 cm
We know that, radius of circle = half of the diameter of the circle

$$r = d/2$$
$$r = 77/2$$
$$r = 38.5 \text{ cm}$$

Area of the circle = πr^2

$$= (22/7) \times (38.5)^2$$
$$= 4658.5 \text{ cm}^2$$

Then, perimeter of the circle = $2\pi r$

$$= 2 \times (22/7) \times (38.5)$$
$$= 242 \text{ cm}$$

(iv)
From the question it is given that, diameter of circle, d = 35 cm
We know that, radius of circle = half of the diameter of the circle

r = d/2

r = 35/2

r = 17.5 cm

Area of the circle = πr^2

= (22/7) × (17.5)^2

= 962.5 cm^2

Then, perimeter of the circle = $2\pi r$

= 2 × (22/7) × (17.5)

= 110 cm

2. Find the area and perimeter of the following semi-circles:

(i) Radius = 1.4 cm

(ii) Diameter = 7 cm

(iii) Diameter = 5.6 cm

Solution:-

(i)

From the question it is given that, radius of semi-circle, r = 1.4 cm

We know that, Area of the semi-circle = $\frac{1}{2}\pi r^2$

= ½ × (22/7) × (1.4)^2

= 3.08 cm^2

Then, perimeter of the semi-circle = $(\pi r + 2r)$

= ((22/7) × (1.4)) + (2 × 1.4)

= 7.2 cm

(ii)

From the question it is given that, diameter of semi-circle, d = 7 cm

We know that, radius of semi-circle = half of the diameter of the semi-circle

r = d/2

r = 7/2

r = 3.5 cm

Area of the semi-circle = ½ πr^2

= ½ × (22/7) × (3.5)^2

= 19.25 cm^2

Then, perimeter of the semi-circle = $(\pi r + 2r)$

= ((22/7) × (3.5)) + (2 × 3.5)

= 18 cm

(iii)

From the question it is given that, diameter of semi-circle, d = 5.6 cm

We know that, radius of semi-circle = half of the diameter of the semi-circle

$r = d/2$

$r = 5.6/2$

$r = 2.8$ cm

Area of the semi-circle = ½ πr^2

= ½ × (22/7) × (2.8)^2

= 12.32 cm^2

Then, perimeter of the semi-circle = (πr + 2r)

= ((22/7) × (2.8)) + (2 × 2.8)

= 14.4 cm

3. Find the area and perimeter of the following sectors:
(i) Radius = 4.2 cm, angle at the center is 60°
(ii) Radius = 6 cm, angle at the center is 70°
(iii) Diameter = 42 cm, angle at the center is 100°.
Solution:-

(i)

From the question it is given that, radius = 4.2 cm, angle at the center = 60°

We know that, Area of the sector = (πr^2 × θ/360°)

= [(22/7) × 4.2^2 × (60°/360°)]

= 9.24 cm^2

Then, perimeter of the sector = 2r + (2πr × θ/360°)

= (2 × 4.2) + [2 × (22/7) × 4.2 × (60°/360°)]

= 8.4 + 4.4

= 12.8 cm

(ii)

From the question it is given that, radius = 6 cm, angle at the center = 70°

We know that, Area of the sector = (πr^2 × θ/360°)

= [(22/7) × 6^2 × (70°/360°)]

= 22 cm^2

Then, perimeter of the sector = 2r + (2πr × θ/360°)

= (2 × 6) + [2 × (22/7) × 6 × (70°/360°)]

= 12 + 7.33

= 19.33 cm

(iii)

From the question it is given that, diameter = 42 cm, angle at the center = 100°

Radius of circle = half of the diameter of the circle

r = d/2

r = 42/2

r = 21 cm

We know that, Area of the sector = $(\pi r^2 \times \theta/360^o)$

$= [(22/7) \times 21^2 \times (100^o/360^o)]$

$= 385\ cm^2$

Then, perimeter of the sector = $2r + (2\pi r \times \theta/360^o)$

$= (2 \times 21) + [2 \times (22/7) \times 21 \times (100^o/360^o)]$

$= 42 + 36.66$

$= 78.66\ cm$

4. Find the area of a circular field that has a circumference of 396 m.
Solution:-

From the question it is given that, circumference of circular field is 396 m

We know that circumference of circle = $2\pi r$

$396 = 2\pi r$

$396 = 2 \times (22/7) \times r$

$r = 396 \times (7/22) \times ½$

$r = 63\ m$

Then, area of circular field = πr^2

$= (22/7) \times (63)^2$

$= 12,474\ cm^2$

Therefore, area of the circular field is 12,474 cm^2.

5. Find the circumference of the circle whose area is 81π cm².
Solution:-

From the question it is given that, area of circle 81π cm^2.

We know that area of circle = πr^2

$81\pi = \pi r^2$

$81\pi/\pi = r^2$

$r^2 = 81$

$r = \sqrt{81}$

$r = 9\ cm$

Then, circumference of circle = $2\pi r$

$= 2 \times \pi \times 9$

$= 18\pi\ cm$

6. The diameter of a wheel is 1.4m. How many revolutions does it make in moving a distance of 2.2 kms?
Solutions:-
From the question it is given that,
Diameter of the wheel = 1.4 m

  r = 1.4/2

  r = 0.7 m
We know that, circumference = 2πr

  = 2 × 22/7 × 0.7

  = 4.4 m
Distance travelled is given = 2.2 km
We know that, 1 km = 1000 m
So, 2.2 km = 2.2 × 1000

  =2,200 m
Then, number of revolutions = 2,200/4.4

  = 500
Therefore, wheel makes 500 revolutions in travelling 2.2km.

7. The wheel of the car makes 10 revolutions per second. If its diameter is 70 cm, find the speed of the car in km per hour.
Solution:-
From the question it is given that,
Diameter of the wheel = 70 cm

  r = 70/2

  r = 35 cm
We know that, circumference = 2πr

  = 2 × 22/7 × 35

  = 220 cm

  = 2.2 m
Number of revolutions = 10 per second
Then, number of revolutions per hour = 10 × 3600

  = 36000 per hour
Distance covered in one hour = 36000 × 2.2 = 79200 m/hour
Therefore, speed of the car in km/hour = 79200/1000 = 79.2 km/h

8. The speed of the car is 66 km/h. If each wheel of the car is 140 cm in diameter, find the number of revolutions made by each wheel per minute.

Solutions:-
From the question it is given that,
The speed of the car = 66 km/h = 66000 m/h
Diameter of the wheel = 140 cm
Radius of wheel, r = 140/2 = 70 cm
We know that, circumference of circle = 2πr

$$= 2 \times 22/7 \times 70$$
$$= 440 \text{ cm}$$
$$= 4.4 \text{ m}$$

Distance travelled by car in one minute = 66000/60
$$= 1100 \text{ m}$$

Number of revolutions in one minute = distance /circumference
$$= 1100/4.4$$
$$= 250$$

Therefore, the number of revolutions made by each wheel = 250 rpm.

9. A cart wheel makes 9 revolutions per second. If the diameter of the wheel is 42 cm, find its speed in km/hr.
Solution:-
From the question it is given that,
Diameter of the wheel = 42 cm
Radius of the wheel, r = 42/2 = 21 cm
Number of revolutions made by a cart wheel = 9 revolutions per second
Number of revolutions made by a cart wheel per hour = 9 × 3600 = 32,400 per hour
We know that, circumference of circle = 2πr

$$= 2 \times 22/7 \times 21$$
$$= 132 \text{ cm}$$
$$= 1.32 \text{ m}$$

Distance covered in one hour = 32,400 × 1.32
$$= 42,768 \text{m/hour}$$

Then, speed of the wheel in km/hour = 42,768/1000
$$= 42.768 \text{ km/h}$$

Therefore, the speed of the wheel is approximately equal to 43km/h.

10. A bucket is raised from a well by means of a rope wound round a wheel of diameter 35 cm. If the bucket ascends in 2 minutes with a uniform speed of 1.1 m/sec, calculate the number of complete revolutions the wheel makes in raising the bucket.

Solution:-
From the question it is given that,
Diameter of wheel = 35 cm
Radius of wheel = 35/2 = 17.5 cm
We know that, circumference of circle = 2πr
$$= 2 × 22/7 × 17.5$$
$$= 110 \text{ cm}$$
Then, time taken by the bucket to ascend = 2 minutes = 120 seconds … [given]
Speed of the rope while ascending = 1.1 m/s
So, the length of rope = 120 × 1.1 = 132 m
Therefore, number of revolutions made by rope = (132 × 100)/110 = 120

11. The circumference of a garden roller is 280 cm. How many revolutions make in moving 490 meters?
Solution:-
From the question it is given that,
The circumference of a garden roller = 280 cm
Total distance travelled = 490 m
Therefore, number of revolutions = 490/2.8 = 175

12. The diameter of a cycle wheel is $4\frac{5}{11}$ cm. How many revolutions will it make in moving 6.3 km?
Solutions:-
From the question it is given that,
Diameter of a cycle wheel = $4\frac{5}{11}$ cm = 49/11 cm
We know that, circumference of circle = πd
$$= 22/7 × 49/11$$
$$= 14 \text{ cm}$$
$$= 1.4 \text{ m}$$
Then, distance travelled = 6.3 km = 6,300 m
Therefore, number of revolutions = 6,300/0.14 = 45,000

13. The area of a circle ring enclosed between two concentric circles is 88 cm². Find the radii of the two circles, if their difference is 1 cm.
Solution:-
Let us assume r be the radius of the inner circle,

And (r + 1) be the radius of the outer circle
Then,
Area of circular ring = Area of outer circle – area of inner circle
$\pi(r + 1)^2 – \pi r^2 = 88$
$\pi(r^2 + 2r + 1) – \pi r^2 = 88$
$\pi r^2 + 2\pi r + \pi – \pi r^2 = 88$
On simplification we get,
$\pi(2r + 1) = 88$
$22/7(2r + 1) = 88$
$2r + 1 = 88 \times 7/22$
$2r + 1 = 28$
$2r = 28 – 1$
$2r = 27$
$r = 27/2$
$r = 13.5$ cm
$(r + 1) = 13.5 + 1 = 14.5$ cm
Therefore, radii of the two circles are 13.5 cm and 14.5 cm.

14. Find the area enclosed between two concentric circles, if their radii are 6 cm and 13 cm respectively.
Solution:-
From the question it is given that,
Radii of the two concentric circles are 6cm and 13 cm respectively.
$r_1 = 6$ cm
$r_2 = 13$ cm
We know that,
Area between two concentric circles = Areas of larger circle – area of smaller circle
Area of circle = πr^2
$\qquad = \pi r_1{}^2 – \pi r_2{}^2$
$\qquad = [(22/7) \times 6^2] – [(22/7) - 13^2]$
$\qquad = 531.1429 – 113.1429$
$\qquad = 418$ cm^2
Therefore, area enclosed between two concentric circles is 418 cm^2.

15. The area between the circumferences of two concentric circles is 2464 cm². If the inner circle has circumference of 132 cm, calculate the radius of outer circle.
Solution:-

From the question it is given that,

The area between the circumferences of two concentric circles is 2464 cm^2.

Circumference of inner circle = 132 cm

We know that, circumference = 2πr

$$132 = 2πr$$
$$r = 132/2π$$
$$r = (132 × 7)/(2 × 22)$$
$$r = 21 \text{ cm}$$

So, radius of inner circle is 21 cm.

Then, area of inner circle = πr^2

$$= 22/7 × 21^2$$
$$= 1,386 \text{ cm}^2$$

Area of outer circle = area of inner circle + area of concentric circles

$$= (1386 + 2464) \text{ cm}^2$$
$$= 3,850 \text{ cm}^2$$

Let R be the radius of outer circle,

Then, we know that area of outer circle = πR^2

$$3,850 = πR^2$$
$$R^2 = (3,850 × 7)/22$$
$$R^2 = 1225$$
$$R = √1225$$
$$R = 35 \text{ cm}$$

Therefore, radius of outer circle is 35 cm.