EXERCISE 11.3   **PAGE: 223**

1. Find the circumference of the circle with the following radius: (Take π = 22/7)

(a) 14 cm

Solution:-

Given, radius of circle = 14 cm

Circumference of the circle = 2πr

$\qquad$ = 2 × (22/7) × 14

$\qquad$ = 2 × 22 × 2

$\qquad$ = 88 cm

(b) 28 cm

Solution:-

Given, radius of circle = 28 cm

Circumference of the circle = 2πr

$\qquad$ = 2 × (22/7) × 28

$\qquad$ = 2 × 22 × 4

$\qquad$ = 176 cm

(c) 21 cm

Solution:-

Given, radius of circle = 21 cm

Circumference of the circle = 2πr

$\qquad$ = 2 × (22/7) × 21

$\qquad$ = 2 × 22 × 3

$\qquad$ = 132 cm

2. Find the area of the following circles, given that:

(a) Radius = 14 mm (Take π = 22/7)

Solution:

Given, radius of circle = 14 mm

Then,

Area of the circle = πr²

$\qquad$ = 22/7 × 14²

$\qquad$ = 22/7 × 196

$\qquad$ = 22 × 28

$\qquad$ = 616 mm²

(b) Diameter = 49 m
Solution:
Given, diameter of circle (d) = 49 m
We know that, radius (r) = d/2
$\qquad\qquad\qquad$ = 49/2
$\qquad\qquad\qquad$ = 24.5 m
Then,
Area of the circle = πr^2
$\qquad\qquad\qquad$ = 22/7 × $(24.5)^2$
$\qquad\qquad\qquad$ = 22/7 × 600.25
$\qquad\qquad\qquad$ = 22 × 85.75
$\qquad\qquad\qquad$ = 1886.5 m^2

(c) Radius = 5 cm
Solution:
Given, radius of circle = 5 cm
Then,
Area of the circle = πr^2
$\qquad\qquad\qquad$ = 22/7 × 5^2
$\qquad\qquad\qquad$ = 22/7 × 25
$\qquad\qquad\qquad$ = 550/7
$\qquad\qquad\qquad$ = 78.57 cm^2

3. If the circumference of a circular sheet is 154 m, find its radius. Also find the area of the sheet. (Take π = 22/7)
Solution:-
From the question it is given that,
Circumference of the circle = 154 m
Then,
We know that, Circumference of the circle = 2πr
$\qquad\qquad\qquad$ 154 = 2 × (22/7) × r
$\qquad\qquad\qquad$ 154 = 44/7 × r
$\qquad\qquad\qquad$ r = (154 × 7)/44
$\qquad\qquad\qquad$ r = (14 × 7)/4
$\qquad\qquad\qquad$ r = (7 × 7)/2
$\qquad\qquad\qquad$ r = 49/2
$\qquad\qquad\qquad$ r = 24.5 m

Now,
Area of the circle = πr²

$$= 22/7 × (24.5)^2$$
$$= 22/7 × 600.25$$
$$= 22 × 85.75$$
$$= 1886.5 \text{ m}^2$$

So, the radius of circle is 24.5 and area of circle is 1886.5.

4. A gardener wants to fence a circular garden of diameter 21m. Find the length of the rope he needs to purchase, if he makes 2 rounds of fence. Also find the cost of the rope, if it costs ₹ 4 per meter. (Take π = 22/7)

Solution:-
From the question it is given that,
Diameter of the circular garden = 21 m
We know that, radius (r) = d/2

$$= 21/2$$
$$= 10.5 \text{ m}$$

Then,
Circumference of the circle = 2πr

$$= 2 × (22/7) × 10.5$$
$$= 462/7$$
$$= 66 \text{ m}$$

So, the length of rope required = 2 × 66 = 132 m
Cost of 1 m rope = ₹ 4   [given]
Cost of 132 m rope = ₹ 4 × 132
$$= ₹ 528$$

5. From a circular sheet of radius 4 cm, a circle of radius 3 cm is removed. Find the area of the remaining sheet. (Take π = 3.14)
Solution:-
From the question it is give that,
Radius of circular sheet R = 4 cm

A circle of radius to be removed r = 3 cm
Then,
The area of the remaining sheet = $\pi R^2 - \pi r^2$

$$= \pi (R^2 - r^2)$$
$$= 3.14 (4^2 - 3^2)$$
$$= 3.14 (16 - 9)$$
$$= 3.14 \times 7$$
$$= 21.98 \text{ cm}^2$$

So, the area of the remaining sheet is 21.98 cm².

6. Saima wants to put a lace on the edge of a circular table cover of diameter 1.5 m. Find the length of the lace required and also find its cost if one meter of the lace costs ₹ 15. (Take π = 3.14)
Solution:-
From the question it is given that,
Diameter of the circular table = 1.5 m
We know that, radius (r) = d/2

$$= 1.5/2$$
$$= 0.75 \text{ m}$$

Then,
Circumference of the circle = 2πr

$$= 2 \times 3.14 \times 0.75$$
$$= 4.71 \text{ m}$$

So, the length of lace = 4.71 m
Cost of 1 m lace = ₹ 15   [given]
Cost of 4.71 m lace = ₹ 15 × 4.71

$$= ₹ 70.65$$

7. Find the perimeter of the adjoining figure, which is a semicircle including its diameter.
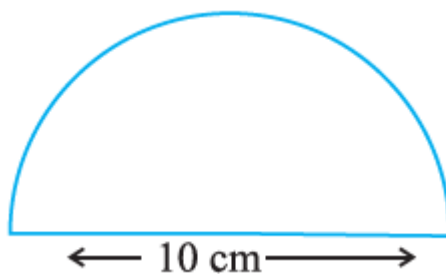
Solution:-

From the question it is given that,
Diameter of semi-circle = 10 cm
We know that, radius (r) = d/2
                        = 10/2
                        = 5 cm
Then,
Circumference of the semi-circle = πr
                                = (22/7) × 5
                                = 110/7
                                = 15.71 cm
Now,
Perimeter of the given figure = Circumference of the semi-circle + semi-circle diameter
                            = 15.71 + 10
                            = 25.71 cm

8. Find the cost of polishing a circular table-top of diameter 1.6 m, if the rate of polishing is ₹15/m². (Take π = 3.14)
Solution:-
From the question it is given that,
Diameter of the circular table-top = 1.6 m
We know that, radius (r) = d/2
                        = 1.6/2
                        = 0.8 m
Then,
Area of the circular table-top = πr²
                            = 3.14 × 0.8²
                            = 3.14 × 0.8 ×0.8
                            = 2.0096 m²
Cost for polishing 1 m² area = ₹ 15   [given]
Cost for polishing 2.0096 m² area = ₹ 15 × 2.0096
                                = ₹ 30.144
Hence, the Cost for polishing 2.0096 m² area is ₹ 30.144.

9. Shazli took a wire of length 44 cm and bent it into the shape of a circle. Find the radius of that circle. Also find its area. If the same wire is bent into the shape of a square, what will be the length of each of its sides? Which figure encloses more area, the circle or the square? (Take π = 22/7)

Solution:-

From the question it is given that,

Length of wire that Shazli took =44 cm

Then,

If the wire is bent into a circle,

We know that, circumference of the circle = 2πr

$$44 = 2 \times (22/7) \times r$$
$$44 = 44/7 \times r$$
$$(44 \times 7)/44 = r$$
$$r = 7 \text{ cm}$$

Area of the circle = πr²

$$= 22/7 \times 7^2$$
$$= 22/7 \times 7 \times 7$$
$$= 22 \times 7$$
$$= 154 \text{ cm}^2$$

Now,

If the wire is bent into a square,

The length of the each side of square = 44/4

$$= 11 \text{ cm}$$

Area of the square = length of the side of square²

$$= 11^2$$
$$= 121 \text{ cm}^2$$

By comparing the two areas of the square and circle,

Clearly, circle encloses more area.

10. From a circular card sheet of radius 14 cm, two circles of radius 3.5 cm and a rectangle of length 3 cm and breadth 1cm are removed. (as shown in the adjoining figure). Find the area of the remaining sheet. (Take π = 22/7)
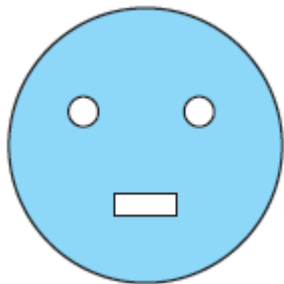
Solution:-

From the question it is given that,

Radius of the circular card sheet = 14 cm
Radius of the two small circle = 3.5 cm
Length of the rectangle = 3 cm
Breadth of the rectangle = 1 cm
First we have to find out the area of circular card sheet, two circles and rectangle to find out the remaining area.
Now,

Area of the circular card sheet = πr^2
= 22/7 × 14²
= 22/7 × 14 × 14
= 22 × 2 × 14
= 616 cm²

Area of the 2 small circles = 2 × πr^2
= 2 × (22/7 × 3.5²)
= 2 × (22/7 × 3.5 × 3.5)
= 2 × ((22/7) × 12.25)
= 2 × 38.5
= 77 cm²

Area of the rectangle = Length × Breadth
= 3 × 1
= 3 cm²

Now,
The area of the remaining part = Card sheet area – (area of two small circles + rectangle area)

= 616 – (77 + 3)
= 616 – 80
= 536 cm²

11. A circle of radius 2 cm is cut out from a square piece of an aluminium sheet of side 6 cm. What is the area of the left over aluminium sheet? (Take π = 3.14)
Solution:-
From the question it is given that,
Radius of circle = 2 cm
Square sheet side = 6 cm
First we have to find out the area of square aluminium sheet and circle to find out the remaining area.
Now,

Area of the square = side²

      = 6²

      = 36 cm²

Area of the circle = πr²

     = 3.14 × 2²

     = 3.14 × 2 × 2

     = 3.14 × 4

     = 12.56 cm²

Now,

The area of the remaining part = Area of aluminum square sheet – area of circle

         = 36 – 12.56

         = 23.44 cm²

12. The circumference of a circle is 31.4 cm. Find the radius and the area of the circle? (Take π = 3.14)

Solution:-

From the question it is given that,
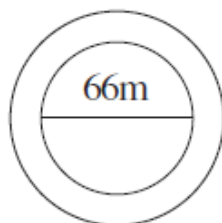
Circumference of a circle = 31.4 cm

We know that,

Circumference of a circle = 2πr

      31.4 = 2 × 3.14 × r

      31.4 = 6.28 × r

      31.4/6.28 = r

      r = 5 cm

Then,

Area of the circle = πr²

     = 3.14 × 5²

     = 3. 14 × 25

     = 78.5 cm

13. A circular flower bed is surrounded by a path 4 m wide. The diameter of the flower bed is 66 m. What is the area of this path? (π = 3.14)

Solution:-

From the question it is given that,

Diameter of the flower bed = 66 m

Then,

Radius of the flower bed = d/2

= 66/2

= 33 m

Area of flower bed = πr^2

= 3.14 × 33^2

= 3.14 × 1089

= 3419.46 m

Now we have to find area of the flower bed and path together

So, radius of flower bed and path together = 33 + 4 = 37 m

Area of the flower bed and path together = πr^2

= 3.14 × 37^2

= 3.14 × 1369

= 4298.66 m

Finally,

Area of the path = Area of the flower bed and path together – Area of flower bed

= 4298.66 – 3419.46

= 879.20 m^2

14. A circular flower garden has an area of 314 m^2. A sprinkler at the centre of the garden can cover an area that has a radius of 12 m. Will the sprinkler water the entire garden? (Take π = 3.14)

Solution:-

From the question it is given that,

Area of the circular flower garden = 314 m^2

Sprinkler at the centre of the garden can cover an area that has a radius = 12 m
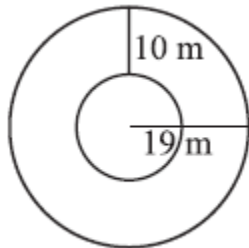
Area of the circular flower garden = πr^2

314 = 3.14 × r^2

314/3.14 = r^2

r^2 = 100

r = √100

r = 10 m

∴Radius of the circular flower garden is 10 m.

Since, the sprinkler can cover an area of radius 12 m

Hence, the sprinkler will water the whole garden.

15. Find the circumference of the inner and the outer circles, shown in the adjoining figure? (Take π = 3.14)

Solution:-
From the figure,
Radius of inner circle = outer circle radius – 10

                   = 19 – 10

                   = 9 m

Circumference of the inner circle = 2πr

                             = 2 × 3.14 × 9

                             = 56.52 m

Then,
Radius of outer circle = 19 m
Circumference of the outer circle = 2πr

                             = 2 × 3.14 × 19

                             = 119.32 m

16. How many times a wheel of radius 28 cm must rotate to go 352 m? (Take π = 22/7)
Solution:-
From the question it is given that,
Radius of the wheel = 28 cm
Circumference of the wheel = 2πr

                           = 2 × 22/7 × 28

                           = 2 × 22 × 4

                           = 176 cm

Now we have to find the number of rotation of the wheel,

                 = Total distance to be covered/ circumference of wheel

                 = 352 m/176 cm

                 = 35200 cm/ 176 cm

                 = 200

17. The minute hand of a circular clock is 15 cm long. How far does the tip of the minute hand move in 1 hour. (Take π = 3.14)

Solution:-

From the question it is given that,

Length of the minute hand of the circular clock = 15 cm

Then,

Distance travelled by the tip of minute hand in 1 hour = circumference of the clock

$$= 2πr$$
$$= 2 × 3.14 × 15$$
$$= 94.2 \text{ cm}$$