

### *Exercise 11.3*

#### **Question 1:**

Find the circumference of the circles with the following radius:  $\left( \text{Take } \pi = \frac{22}{7} \right)$

(a) 14 cm

(b) 28 mm

(c) 21 cm

#### **Answer 1:**

(a) Circumference of the circle =  $2\pi r = 2 \times \frac{22}{7} \times 14 = 88$  cm

(b) Circumference of the circle =  $2\pi r = 2 \times \frac{22}{7} \times 28 = 176$  mm

(c) Circumference of the circle =  $2\pi r = 2 \times \frac{22}{7} \times 21 = 132$  cm

#### **Question 2:**

Find the area of the following circles, given that:  $\left( \text{Take } \pi = \frac{22}{7} \right)$

(a) radius = 14 mm

(b) diameter = 49 m

(c) radius 5 cm

#### **Answer 2:**

(a) Area of circle =  $\pi r^2 = \frac{22}{7} \times 14 \times 14$   
 $= 22 \times 2 \times 14$   
 $= 616 \text{ mm}^2$

(b) Diameter = 49 m

$\therefore \text{ radius} = \frac{49}{2} = 24.5 \text{ m}$

$\therefore \text{ Area of circle} = \pi r^2 = \frac{22}{7} \times 24.5 \times 24.5$   
 $= 22 \times 3.5 \times 24.5$   
 $= 1886.5 \text{ m}^2$

(c) Area of circle =  $\pi r^2 = \frac{22}{7} \times 5 \times 5$   
 $= \frac{550}{7} \text{ cm}^2$

**Question 3:**

If the circumference of a circular sheet is 154 m, find its radius. Also find the area of the sheet.  $\left( \text{Take } \pi = \frac{22}{7} \right)$

**Answer 3:**

Circumference of the circular sheet = 154 m

$$\Rightarrow 2\pi r = 154 \text{ m}$$

$$\Rightarrow r = \frac{154}{2\pi}$$

$$\Rightarrow r = \frac{154 \times 7}{2 \times 22} = 24.5 \text{ m}$$

$$\begin{aligned} \text{Now Area of circular sheet} &= \pi r^2 = \frac{22}{7} \times 24.5 \times 24.5 \\ &= 22 \times 3.5 \times 24.5 = 1886.5 \text{ m}^2 \end{aligned}$$

Thus, the radius and area of circular sheet are 24.5 m and 1886.5 m<sup>2</sup> respectively.

**Question 4:**

A gardener wants to fence a circular garden of diameter 21 m. Find the length of the rope he needs to purchase, if he makes 2 rounds of fence. Also, find the costs of the rope, if it cost ₹4 per meter.  $\left( \text{Take } \pi = \frac{22}{7} \right)$

**Answer 4:**

Diameter of the circular garden = 21 m

$$\therefore \text{Radius of the circular garden} = \frac{21}{2} \text{ m}$$

$$\begin{aligned} \text{Now Circumference of circular garden} &= 2\pi r = 2 \times \frac{22}{7} \times \frac{21}{2} \\ &= 22 \times 3 = 66 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{The gardener makes 2 rounds of fence so the total length of the rope of fencing} \\ &= 2 \times 2\pi r \\ &= 2 \times 66 = 132 \text{ m} \end{aligned}$$

Since, the cost of 1 meter rope = ₹ 4

Therefore, cost of 132 meter rope = 4 x 132 = ₹ 528

**Question 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  $\pi = 3.14$ )

**Answer 5:**

Radius of circular sheet ( $R$ ) = 4 cm and

radius of removed circle ( $r$ ) = 3 cm

Area of remaining sheet

$$= \text{Area of circular sheet} - \text{Area of removed circle}$$

$$= \pi R^2 - \pi r^2 = \pi (R^2 - r^2)$$

$$= \pi (4^2 - 3^2) = \pi (16 - 9)$$

$$= 3.14 \times 7 = 21.98 \text{ cm}^2$$

Thus, the area of remaining sheet is  $21.98 \text{ cm}^2$ .

**Question 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  $\pi = 3.14$ )

**Answer 6:**

Diameter of the circular table cover = 1.5 m

$$\therefore \text{Radius of the circular table cover} = \frac{1.5}{2} \text{ m}$$

Circumference of circular table cover =  $2\pi r$

$$= 2 \times 3.14 \times \frac{1.5}{2}$$

$$= 4.71 \text{ m}$$

Therefore the length of required lace is 4.71 m.

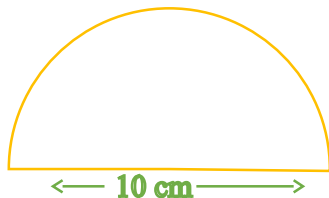
Now the cost of 1 m lace = ₹ 15

$$\begin{aligned} \text{Then the cost of 4.71 m lace} &= 15 \times 4.71 \\ &= ₹ 70.65 \end{aligned}$$

Hence, the cost of 4.71 m lace is ₹ 70.65.

**Question 7:**

Find the perimeter of the adjoining figure, which is a semicircle including its diameter.



**Answer 7:**

Diameter = 10 cm

$$\therefore \text{Radius} = \frac{10}{2} = 5 \text{ cm}$$

According to question,

Perimeter of figure = Circumference of semi-circle + diameter

$$\begin{aligned} &= \pi r + D \\ &= \frac{22}{7} \times 5 + 10 = \frac{110}{7} + 10 \\ &= \frac{110 + 70}{7} = \frac{180}{7} = 25.71 \text{ cm} \end{aligned}$$

Thus, the perimeter of the given figure is 25.71 cm.

**Question 8:**

Find the cost of polishing a circular table-top of diameter 1.6 m, if the rate of polishing is ₹15/m<sup>2</sup>. (Take  $\pi = 3.14$ )

**Answer 8:**

Diameter of the circular table top = 1.6 m

$$\therefore \text{Radius of the circular table top} = \frac{1.6}{2} = 0.8 \text{ m}$$

$$\begin{aligned} \text{Area of circular table top} &= \pi r^2 \\ &= 3.14 \times 0.8 \times 0.8 \\ &= 2.0096 \text{ m}^2 \end{aligned}$$

Now cost of 1 m<sup>2</sup> polishing = ₹15

Then cost of 2.0096 m<sup>2</sup> polishing = 15 x 2.0096 = ₹ 30.14 (approx.)

Thus, the cost of polishing a circular table top is ₹ 30.14 (approx.)

**Question 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  $\pi = \frac{22}{7}$ )

**Answer 9:**

Total length of the wire = 44 cm

$\therefore$  the circumference of the circle =  $2\pi r = 44$  cm

$$\Rightarrow 2 \times \frac{22}{7} \times r = 44$$

$$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7 \text{ cm}$$

$$\begin{aligned} \text{Now Area of the circle} &= \pi r^2 \\ &= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2 \end{aligned}$$

Now the wire is converted into square.

Then perimeter of square = 44 cm

$$\Rightarrow 4 \times \text{side} = 44$$

$$\Rightarrow \text{side} = \frac{44}{4} = 11 \text{ cm}$$

$$\text{Now area of square} = \text{side} \times \text{side} = 11 \times 11 = 121 \text{ cm}^2$$

Therefore, on comparing, the area of circle is greater than that of square, so the circle enclosed more area.

**Question 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 1 cm are removed (as shown in the adjoining figure). Find the area of the remaining sheet. (Take  $\pi = \frac{22}{7}$ )



**Answer 10:**

Radius of circular sheet (R) = 14 cm and Radius of smaller circle (r) = 3.5 cm

Length of rectangle (l) = 3 cm and breadth of rectangle (b) = 1 cm

According to question,

Area of remaining sheet = Area of circular sheet – (Area of two smaller circle + Area of rectangle)

$$\begin{aligned} &= \pi R^2 - [2(\pi r^2) + (l \times b)] \\ &= \frac{22}{7} \times 14 \times 14 - \left[ \left( 2 \times \frac{22}{7} \times 3.5 \times 3.5 \right) - (3 \times 1) \right] \\ &= 22 \times 14 \times 2 - [44 \times 0.5 \times 3.5 + 3] \\ &= 616 - 80 \\ &= 536 \text{ cm}^2 \end{aligned}$$

Therefore the area of remaining sheet is 536 cm<sup>2</sup>.

**Question 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  $\pi = 3.14$ )

**Answer 11:**

Radius of circle = 2 cm and side of aluminium square sheet = 6 cm

According to question,

$$\begin{aligned} \text{Area of aluminium sheet left} &= \text{Total area of aluminium sheet} - \text{Area of circle} \\ &= \text{side} \times \text{side} - \pi r^2 \\ &= 6 \times 6 - \frac{22}{7} \times 2 \times 2 \\ &= 36 - 12.56 \\ &= 23.44 \text{ cm}^2 \end{aligned}$$

Therefore, the area of aluminium sheet left is 23.44 cm<sup>2</sup>.

**Question 12:**

The circumference of a circle is 31.4 cm. Find the radius and the area of the circle. (Take  $\pi = 3.14$ )

**Answer 12:**

The circumference of the circle = 31.4 cm

$$\Rightarrow 2\pi r = 31.4$$

$$\Rightarrow 2 \times 3.14 \times r = 31.4$$

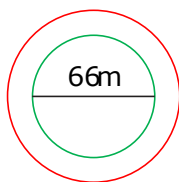
$$\Rightarrow r = \frac{31.4}{2 \times 3.14} = 5 \text{ cm}$$

$$\begin{aligned} \text{Then area of the circle} &= \pi r^2 = 3.14 \times 5 \times 5 \\ &= 78.5 \text{ cm}^2 \end{aligned}$$

Therefore, the radius and the area of the circle are 5 cm and 78.5 cm<sup>2</sup> respectively.

**Question 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? (Take  $\pi = 3.14$ )

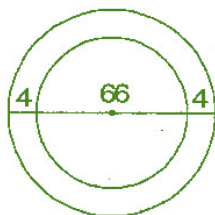


**Answer 13:**

Diameter of the circular flower bed = 66 m

$$\therefore \text{Radius of circular flower bed } (r) = \frac{66}{2} = 33 \text{ m}$$

$$\therefore \text{Radius of circular flower bed with 4 m wide path } (R) = 33 + 4 = 37 \text{ m}$$



According to the question,

Area of path = Area of bigger circle - Area of smaller circle

$$= \pi R^2 - \pi r^2 = \pi (R^2 - r^2)$$

$$= \pi [(37)^2 - (33)^2]$$

$$= 3.14 [(37 + 33) (37 - 33)]$$

$$[\because a^2 - b^2 = (a + b)(a - b)]$$

$$\begin{aligned} &= 3.14 \times 70 \times 4 \\ &= 879.20 \text{ m}^2 \end{aligned}$$

Therefore, the area of the path is  $879.20 \text{ m}^2$ .

**Question 14:**

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

**Answer 14:**

$$\begin{aligned} \text{Circular area by the sprinkler} &= \pi r^2 \\ &= 3.14 \times 12 \times 12 \\ &= 3.14 \times 144 \\ &= 452.16 \text{ m}^2 \end{aligned}$$

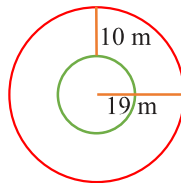
$$\text{Area of the circular flower garden} = 314 \text{ m}^2$$

Since Area of circular flower garden is smaller than area by sprinkler.

Therefore, the sprinkler will water the entire garden.

**Question 15:**

Find the circumference of the inner and the outer circles, shown in the adjoining figure. (Take  $\pi = 3.14$ )



**Answer 15:**

$$\text{Radius of outer circle } (r) = 19 \text{ m}$$

$$\begin{aligned} \therefore \text{Circumference of outer circle} &= 2\pi r = 2 \times 3.14 \times 19 \\ &= 119.32 \text{ m} \end{aligned}$$

$$\text{Now radius of inner circle } (r') = 19 - 10 = 9 \text{ m}$$

$$\begin{aligned} \therefore \text{Circumference of inner circle} &= 2\pi r' = 2 \times 3.14 \times 9 \\ &= 56.52 \text{ m} \end{aligned}$$

Therefore, the circumferences of inner and outer circles are  $56.52 \text{ m}$  and  $119.32 \text{ m}$  respectively.



**Question 16:**

How many times a wheel of radius 28 cm must rotate to go 352 m?  $\left( \text{Take } \pi = \frac{22}{7} \right)$

**Answer 16:**

Let wheel must be rotate  $n$  times of its circumference.

Radius of wheel = 28 cm and Total distance = 352 m = 35200 cm

$\therefore$  Distance covered by wheel =  $n \times$  circumference of wheel

$$\Rightarrow 35200 = n \times 2\pi r$$

$$\Rightarrow 35200 = n \times 2 \times \frac{22}{7} \times 28$$

$$\Rightarrow n = \frac{35200 \times 7}{2 \times 22 \times 28}$$

$$\Rightarrow n = 200 \text{ revolutions}$$

Thus, wheel must rotate 200 times to go 352 m.

**Question 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  $\pi = 3.14$ )

**Answer 17:**

In 1 hour, minute hand completes one round means makes a circle.

Radius of the circle ( $r$ ) = 15 cm

$$\begin{aligned} \text{Circumference of circular clock} &= 2\pi r \\ &= 2 \times 3.14 \times 15 \\ &= 94.2 \text{ cm} \end{aligned}$$

Therefore, the tip of the minute hand moves 94.2 cm in 1 hour.