Mathematics

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(Chapter – 11) (Perimeter and Area)

(Class – VII)

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 = $\pi r^2 = \frac{22}{7} \times 14 \times 14$

$= 22 \text{ x } 2 \text{ x } 14$

$= 616 \text{ mm}^2$

(b) Diameter = 49 m

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

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

$= 22 \text{ x } 3.5 \text{ x } 24.5$

$= 1886.5 \text{ m}^2$

(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

$\Rightarrow \quad 2\pi r = 154$ m

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

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

Now Area of circular sheet = $\pi r^2 = \frac{22}{7} \times 24.5 \times 24.5$

$= 22 \times 3.5 \times 24.5 = 1886.5 \text{ m}^2$

Thus, the radius and area of circular sheet are 24.5 m and 1886.5 m^2 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

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

Now Circumference of circular garden $= 2\pi r = 2 \times \frac{22}{7} \times \frac{21}{2}$

$= 22 \times 3 = 66$ m

The gardener makes 2 rounds of fence so the total length of the rope of fencing

$= 2 \times 2\pi r$

$= 2 \times 66 = 132$ m

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. $(\text{Take } \pi = 3.14)$

Answer 5:

Radius of circular sheet (R) = 4 cm and

radius of removed circle (r) = 3 cm

Area of remaining sheet

= Area of circular sheet – Area of removed circle

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

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

= 3.14 x 7 = 21.98 cm^2

Thus, the area of remaining sheet is 21.98 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. $(\text{Take } \pi = 3.14)$

Answer 6:

Diameter of the circular table cover = 1.5 m

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

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

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

= 4.71 m

Therefore the length of required lace is 4.71 m.

Now the cost of 1 m lace = ₹ 15

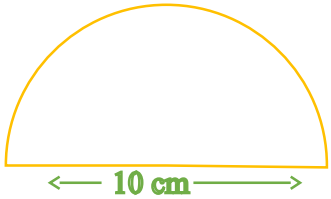
Then the cost of 4.71 m lace = 15 x 4.71

= ₹ 70.65

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

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

According to question,

Perimeter of figure = Circumference of semi-circle + diameter

$= \pi r + D$

$= \frac{22}{7} \times 5 + 10 = \frac{110}{7} + 10$

$= \frac{110+70}{7} = \frac{180}{7} = 25.71$ cm

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^2. (Take $\pi = 3.14$)

Answer 8:

Diameter of the circular table top = 1.6 m

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

Area of circular table top $= \pi r^2$

$= 3.14 \times 0.8 \times 0.8$

$= 2.0096$ m^2

Now cost of 1 m^2 polishing = ₹15

Then cost of 2.0096 m^2 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? $\left(\text{Take } \pi = \frac{22}{7}\right)$

Answer 9:

Total length of the wire = 44 cm

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

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

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

Now Area of the circle $= \pi r^2$

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

Now the wire is converted into square.

Then perimeter of square = 44 cm

$\Rightarrow$ 4 x side = 44

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

Now area of square = side x side = 11 x 11 = 121 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. $\left(\text{Take } \pi = \frac{22}{7}\right)$

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)

$$= \pi R^2 - \left[2(\pi r^2) + (l \times b)\right]$$

$$= \frac{22}{7} \times 14 \times 14 - \left[\left(2 \times \frac{22}{7} \times 3.5 \times 3.5\right) - (3 \times 1)\right]$$

= 22 x 14 x 2 – [44 x 0.5 x 3.5 + 3]

= 616 – 80

= 536 cm^2

Therefore the area of remaining sheet is 536 cm^2.

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? $(\text{Take } \pi = 3.14)$

Answer 11:

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

According to question,

Area of aluminium sheet left = Total area of aluminium sheet – Area of circle

= side x side - πr^2

= 6 x 6 – $\frac{22}{7}$ x 2 x 2

= 36 – 12.56

= 23.44 cm^2

Therefore, the area of aluminium sheet left is 23.44 cm^2.

Question 12:

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

Answer 12:

The circumference of the circle = 31.4 cm

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

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

$\Rightarrow \quad r = \dfrac{31.4}{2 \times 3.14} = 5$ cm

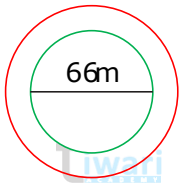
Then area of the circle = $\pi r^2 = 3.14 \times 5 \times 5$

$= 78.5$ cm^2

Therefore, the radius and the area of the circle are 5 cm and 78.5 cm^2 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 $\pi = 3.14$)

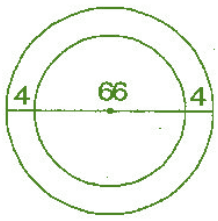


Answer 13:

Diameter of the circular flower bed = 66 m

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

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



According to the question,

Area of path = Area of bigger circle – Area of smaller circle

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

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

$= 3.14\ [(37 + 33)\ (37 - 33)]$ $\qquad \left[\because a^2 - b^2 = (a+b)(a-b)\right]$

= 3.14 x 70 x 4
= 879.20 m^2

Therefore, the area of the path is 879.20 m^2.

Question 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 $\pi = 3.14$)

Answer 14:

Circular area by the sprinkler = πr^2
= 3.14 x 12 x 12
= 3.14 x 144
= 452.16 m^2

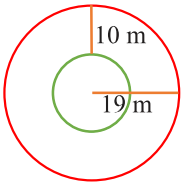
Area of the circular flower garden = 314 m^2

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:

Radius of outer circle (r) = 19 m

$\therefore$ Circumference of outer circle = $2\pi r$ = 2 x 3.14 x 19
= 119.32 m

Now radius of inner circle (r') = 19 – 10 = 9 m

$\therefore$ Circumference of inner circle = $2\pi r'$ = 2 x 3.14 x 9
= 56.52 m

Therefore, the circumferences of inner and outer circles are 56.52 m and 119.32 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 x circumference of wheel

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

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

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

$\Rightarrow \quad n$ = 200 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? $\left(\text{Take } \pi = 3.14\right)$

Answer 17:

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

Radius of the circle $\left(r\right)$ = 15 cm

Circumference of circular clock $= 2\pi r$

= 2 x 3.14 x 15

= 94.2 cm

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