CBSE Class –VII Mathematics
NCERT Solutions
Chapter 11 Perimeter and Area (Ex. 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: (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

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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: (a) Area of circle = πr^2 = $\frac{22}{7} \times 14 \times 14$ = 22 x 2 x 14 = 616 mm^2

(b) Diameter = 49 m

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

$\therefore$ Area of circle = πr^2 = $\frac{22}{7} \times 24.5 \times 24.5$ = 22 x 3.5 x 24.5 = 1886.5 m^2

(c) Area of circle = πr^2 = $\frac{22}{7} \times 5 \times 5$ = $\frac{550}{7}$ 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: Circumference of the circular sheet = 154 m

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

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

Now, Area of circular sheet = $\pi r^2 = \frac{22}{7} \times 24.5 \times 24.5$ = 22 x 3.5 x 24.5 = 1886.5 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 Rs. 4 per meter. $\left(\text{Take } \pi = \frac{22}{7}\right)$

Answer: Diameter of the circular garden = 21 m

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

Now, Circumference of circular garden = $2\pi r = 2 \times \frac{22}{7} \times \frac{21}{2}$ = 2 x 11 x 3 = 22 x 3 = 66 m

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

= 2 x $2\pi r$ = 2 x 66 = 132 m

Since the cost of 1 meter rope = Rs. 4

Therefore, cost of 132 meter rope = 4 x 132 = Rs. 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. $\left(\text{Take } \pi = 3.14\right)$

Answer: 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

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

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

= 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 Rs. 15. $\left(\text{Take } \pi = 3.14 \right)$

Answer: Diameter of the circular table cover = 1.5 m

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

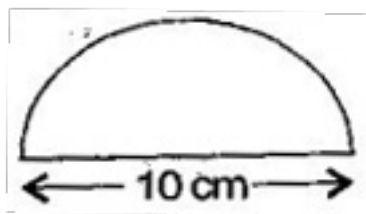Circumference of circular table cover = $2\pi r$ = $2 \times 3.14 \times \frac{1.5}{2}$ = 4.71 m

Therefore the length of required lace is 4.71 m.

Now the cost of 1 m lace = Rs. 15

Then the cost of 4.71 m lace = 15 x 4.71 = Rs. 70.65

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

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

Answer: 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 Rs. 15/m^2. $\left(\text{Take } \pi = 3.14 \right)$

Answer: 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 = πr^2 = 3.14 x 0.8 x 0.8 = 2.0096 m^2

Now cost of 1 m^2 polishing = Rs. 15

Then cost of 2.0096 m^2 polishing = 15 x 2.0096 = Rs. 30.14 (approx.)

Thus, the cost of polishing a circular table top is Rs. 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: 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 cm

Now Area of the circle = πr^2 = $\frac{22}{7} \times 7 \times 7$ = 154 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. $\left(\text{Take } \pi = \frac{22}{7} \right)$
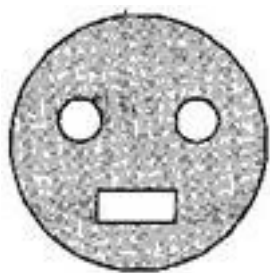
Answer: Radius of circular sheet (R) = 14 cm and Radius of smaller circle (r) = 3.5 cm

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 circles + Area of rectangle)

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

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

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

Answer: 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. $\left(\text{Take } \pi = 3.14\right)$

Answer: The circumference of the circle = 31.4 cm

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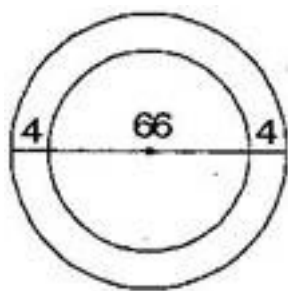
$\Rightarrow r = \frac{31.4}{2 \times 3.14}$ = 5 cm

Then area of the circle = πr^2 = 3.14 x 5 x 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? $\left(\text{Take } \pi = 3.14\right)$

Answer: Diameter of the circular flower bed = 66 m

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

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

= 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? $\left(\text{Take } \pi = 3.14 \right)$
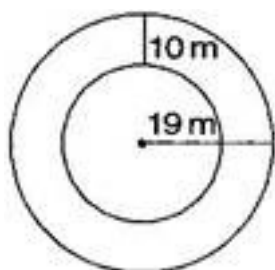
Answer: Circular area by the sprinkler = πr^2 = 3.14 x 12 x 12

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

Answer: Radius of outer circle $\left(r \right)$ = 19 m

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

Now radius of inner circle $\left(r' \right)$ = 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: 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

$\Rightarrow$ 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 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: 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.