chapter-21 Mensuration-II
Exercise-21.1

Solution-2:

(i) 7cm.

Diameter of a circle = 7cm.

Radius of a circle = $\frac{\text{Diameter}}{2}$

$= \frac{7\text{cm}}{2}$

$= 3.5\text{cm}$

circumference of a circle = $\pi D = \frac{22}{7} \times 7\text{cm} = 22\text{cm}$.

(ii) Diameter of a circle = 4.2cm

circumference of the circle = πD cm

$= \frac{22}{7} \times 4.2$ cm

$= 13.2\text{cm}$.

(iii) Diameter of a circle = 11.2km

circumference of the circle = πD km

$= \frac{22}{7} \times 11.2$ km

$= 35.2\text{km}$

Solution-03:-

(i) It is Given that

circumference of a circle $= 2\pi r = 52.8\text{cm}$

$\Rightarrow \quad r = \frac{52.8}{2 \times 22} \times 7$ cm

$\Rightarrow \quad r = 8.4\text{cm}$.

(ii) It is Given that,

Circumference of a circle $= 2\pi r = 42\text{cm}$

$\Rightarrow r = \frac{42}{2\pi} = \frac{42}{2 \times 22} \times 7$ cm

$\Rightarrow$ radius $= 6.68\text{cm}$

$\therefore$ radius of a circle $= 6.68\text{cm}$.

(iii) we have,

Circumference of a circle $= 6.6\text{km}$

$\Rightarrow 2\pi r = 6.6\text{km}$

$\Rightarrow r = \frac{6.6}{2 \times 22} \times 7\text{km}$

$\Rightarrow r = 1.05\text{km}$.

Solution-04:-

(i) We have,

Circumference of a circle = 12.56 cm = πD

$\Rightarrow \pi D = 12.56$ cm

$\Rightarrow$ Diameter = $\frac{12.56}{22} \times 7$ cm

$\Rightarrow$ Diameter = 3.99cm.

(ii) We have,

Circumference of a circle = 88cm = πD

$\Rightarrow \pi D = 88$m

$\Rightarrow$ Diameter = $\frac{88}{22} \times 7$ m

$\Rightarrow$ Diameter = 28m.

(iii) We have,

Circumference of a circle = 11.0km = πD

$\Rightarrow \pi D = 11.0$km

$\Rightarrow$ Diameter = $\frac{11.0}{22} \times 7$ km

$\Rightarrow$ Diameter = 3.5 km.

$\therefore$ Diameter of a circle = 3.5km.

Solution-05:-

We have, ratio of radii = ~~23:5~~ 3:2

So, let the radii of two circles be $3r$ and $2r$ respec-tevely.

Let C_1 and C_2 be the circumference of two circles radii $3r$ and $2r$ respectevely. Then,

$C_1 = 2\pi \times 3r = 6\pi r$ and $C_2 = 2\pi \times 2r = 4\pi r$

$\therefore \frac{C_1}{C_2} = \frac{6\pi r}{4\pi r} = \frac{3}{2}$.

Solution-06:-

We have,

Length of the wire = $2(l+b)$ cm

$= (18.7 + 14.3)$ cm

$= 33$cm.

Let the wire be bent into the form of a circle of radius r cm. Then,

circumference = 33cm

$\Rightarrow 2\pi r = 33$cm

$\Rightarrow r = \frac{33}{2\pi}$ cm

$\Rightarrow r = \frac{33^3}{2 \times 22} \times 7 = \frac{21}{4}$ cm

$\Rightarrow$ radius = 5.25cm.

$\therefore$ radius of a circle = 5.25cm

Solution - 07 :-

We have,

Length of the equilateral triangle = 6.6cm + 6.6cm + 6.6cm

= 20.8cm.

Let the wire be bent into the form of a circle of diameter D cm. Then

Circumference = 20.8cm

$\Rightarrow \pi D = 20.8\text{cm}$

$\Rightarrow D = \frac{20.8}{22} \times 7\text{ cm}$

$\Rightarrow$ Diameter = 6.3 cm

Diameter of a circle = 6.3cm.

Solution-08 :-

We have,

Diameter of a wheel of a car is 98^{63}cm.

circumference of a circle = $\frac{22}{7} \times 63$ cm

$= 22 \times 9$ cm

$= 198$ cm

The wheel makes 1000 revolutions = 1000×198 cm

= 1980 m.

∴ The distance travelled by the car is 1980m.

Solution-09:-

The diameter of a wheel of a car is 98cm.

Circumference of a circle = πD cm

$= \frac{22}{7} \times 98$ cm

$= 22 \times 14$ cm

$= 308$cm

distance travelled by a wheel = 6160m.

one revolution distance = c = 308cm

Number of revolutions = $\frac{6160^{20} \times 100\text{cm}}{308\text{ cm}}$ [∵1m=100cm]

= 2000 revolutions.

∴ 2000 revolutions will it take to travel 6160 metres.

Solution-10:-

we know that

Circumference of a circle $= 2\pi r$.

we have,

radius $= 384400$ km

Circumference (C) $= 2\pi \times 384400$

$= 2 \times \frac{22}{7} \times 384400$ km

$\therefore$ circumference $= 2416228.57$ km.

Solution-11:-

Circular field of radius $= 21$m

John cycling at the speed $= 8$ km/hr

$= \frac{8 \times 1000\text{m}}{3600\text{s}}$.

circumference $C = 2\pi r = 2 \times \frac{22}{7} \times 21$

$= 2 \times 22 \times 3$

$= 132$ m.

Time $= \frac{\text{Distance}}{\text{speed}} = \frac{132 \times 3600}{8000}$

$= \frac{132 \times 36}{80}$

$= \frac{33 \times 18}{10}$

$= 59.4$ seconds.

Solution-12:-

Radius of hour hand $= 4$cm

minute hand $= 6$cm.

The distance travelled by their tips in 2 days.

$= 2$[circumference of hour hand in day + circumference of minute hand in one day]

$= 2\left[2 \times \frac{22}{7} \times 4 + 2 \times \frac{22}{7} \times 24 \times 6\right]$

$= 2\left(\frac{44}{7}\right)[4 + 144] = \frac{88}{7}[148] = 1910.8$ cm

The sum of the distances travelled by their tips in 2 days $= 1910.8$cm

Solution-13:-

we have,

Side of a rhombous $= 2.2$m.

perimeter of a rhombous $= 4(2.2\text{m})$

$= 8.8$m

In the given information

A rhombous has the same perimeter as the circumference of a circle.

we know that,

Circumference of a circle $= 2\pi r = 8.8$m

$\Rightarrow r = \frac{8.8}{2 \times \pi} = \frac{8.8}{2 \times 22} \times 7$

$\Rightarrow r = 1.4$m.

Solution-14:-

We have Radius of a circle = 28 cm

circumference of a circle $= 2 \times \frac{22}{7} \times 28\text{cm}$

$= 8 \times 22\text{cm}$

$= 176\text{cm}.$

Length of circle is bent into a form of the square.

Given,

Length of circle circumference = Square circumference.

$176\text{ cm} = 4(\text{side})$

$\text{side} = 44\text{cm}.$

$\therefore$ Side of the square $= 44\text{cm}.$

Solution - 15:-

Number of Revolutions = 5,000.

Total distance travelled = 11km.

$$\text{Number of Revolutions} = \frac{\text{Total distance travelled}}{\text{Distance travelled in one revolution}}$$

$$5000 = \frac{11\text{ km}}{\text{Distance travelled in one revolution.}}$$

distance travelled in one revolution = c

$$c = \frac{11,000}{5,000} = \frac{11}{5}\text{ m} \quad [\because 1\text{km} = 1000\text{m}]$$

we know that,

$$\text{circumference} = 2\pi r$$

$$\frac{11}{5}\text{ m} = 2\pi r = \pi D$$

$$2 \times \text{radius} = \frac{11}{5} \times \frac{7}{22}$$

$$\text{Diameter} = \frac{7}{10}$$

$$\text{Distance} = 0.70\text{m}$$

$$\text{Distance} = 70\text{cm} \quad [\because 1\text{m} = 100\text{cm}]$$

Solution-16:-

We have,

Diameter of the wheel = 60 cm.

circumference of the wheel = πD

$$= \frac{22}{7} \times 60\text{ cm} = \frac{1320}{7}\text{cm}$$

Wheels of cycle are making 140 revolutions per minute.

Travelling distance by cycle in one minute $= \frac{1320}{7}\text{cm} \times 140$ revolutions

Distance travelled by the cycle in one hour

$$\text{Speed per hour} = \frac{1320}{7} \times 140 \times 60$$

$$= 132 \times 12 \times 1000$$

$$= 1584000\text{ cm}.$$

$$= 15.84\text{ km/hr}$$

$\therefore$ Speed Per hour $= 15.84\text{ km/hr}.$

Solution-17:-

We have,

Diameter of the driving wheel of a bus is 140cm.

circumference of a bus = $\frac{22}{7} \times 140$

$= 22 \times 20$

$= 440$ cm.

Given, Speed per hour = 66 KM/hr

Speed per hour = No. of revolutions x circumference of wheel.

$\frac{66 \times 1000 \times 100}{60} = 440$ cm = No of revolutions per minute

$\Rightarrow$ revolutions per minute = $\frac{1500}{6} = 250$.

Solution-18:-

A water sprinkler in Lawn

Spray radius = 7m.

length of the outer edge of wet grass = $2\pi r$

$= 2 \times \frac{22}{7} \times 7m$

$= 44m$.

length = 44m.

Solution-19:-

Given,

Diameter of a well = 150cm

Radius of the well = $\frac{150}{2}$ cm

$= 75$cm.

length of the outer edge of the parapet = 660cm

$\Rightarrow$ circumference (C) = 660cm

$\Rightarrow C = 660$cm

$\Rightarrow 2\pi r = 660$cm

$\Rightarrow r = \frac{660}{2 \times \frac{22}{7}} \times 7$ cm

$\Rightarrow r = 105$cm.

$\Rightarrow$ radius = 105cm.

$\therefore$ width of the Parapet = radius of Parapet edge - radius of well

$= 105$cm $- 75$cm

$= 30$cm.

$\therefore$ width of the parapet = 30cm.

Solution-20:-

Given,

rope radius = 3m.

Circumference of rope = $2\pi r$

$= 2 \times \frac{22}{7} \times 3\ m$

$= \frac{132}{7} m.$

distance covered in one round = $\frac{132}{7}$ m.

distance covered in 14 rounds = $\frac{14 \times 132}{7} m$

$= 264\ m$

$\therefore$ distance covered by ox in 14 rounds = 264 m.

chapter-21 Mensuration-II

Exercise-21.2

Solution-05:-

It is given that,

circumference of a circle = 3.14m.

$\Rightarrow 2\pi r = 3.14$

$\Rightarrow$ radius $= \frac{3.14}{2 \times \pi}$

$\Rightarrow$ radius $= \frac{1}{2}$ m

$\Rightarrow$ radius $= 0.5$m.

We know that,

Area of a circle $= \pi r^2$

$= \frac{22}{7} \times 0.5 \times 0.5$

$= 0.785 m^2$

Solution-06:-

Given that,

Area of a circle $= 50.24\ m^2$

$\Rightarrow \pi r^2 = 50.24\ m^2$

$\Rightarrow r = \sqrt{\frac{50.24}{\pi}}$ m

$\Rightarrow$ Radius $= \sqrt{16}$ m $= 4$m.

circumference of a circle $= 2\pi r$

$= 2 \times 3.14 \times 4$

$= 25.12$ m

Solution-07:-

We have.

Radius of a Long strip = 28m.

We know that,

Area of a circle $= \pi r^2$

$= \frac{22}{7} \times 28 \times 28$

$= 22 \times 4 \times 28$

$= 2464 m^2$

Solution-09:-

we have,

circumference of a circular park = 352 m

$\Rightarrow 2\pi r = 352\ m$

$\Rightarrow r = \frac{352}{2\pi}\ m$

$\Rightarrow r = \frac{352}{2\times\frac{22}{7}} \times 7\ m.$

$\Rightarrow r = 56\ m.$

Radius of park = 56 m.

Road wide = 7m

Radius of surrounded road with circular park = 56m + 7m.

= 63m.

Area of Road = $\pi \times (63)^2 - \pi(56)^2$

$= \frac{22}{7} \times 63 \times 63 - \frac{22}{7} \times 56 \times 56$

$= 22[9 \times 63 - 8 \times 56]$

$= 22[567 - 448]$

$= 22[119]$

$= 2618$

Area of road = $2618\ m^2$

Solution-10:-

Radius of circular region = r

Radius of circular Region including path = (r+h) m

Area of a circular path of uniform width h = [Area of larger circle with radius (r+h)] - [Area of smaller circle with radius r]

$= \pi(r+h)^2 - \pi r^2$

$= \pi[r^2 + h^2 + 2rh - r^2]$

$= \pi[h^2 + 2rh]$

$= \pi h[2r+h].$

$\therefore$ required Area = $\pi h[2r+h]$.

Solution-11:-

we have,

perimeter of a circle = $4\pi r$ cm.

we know that,

Perimeter of a circle $\Rightarrow 2\pi R = 4\pi r$

$\Rightarrow R = \frac{4\pi r}{2\pi}$

$\Rightarrow R = 2r.$

$\therefore$ Area of a circle = πR^2

$= \pi(2r)^2$

$= 4\pi r^2\ cm^2$

$\therefore$ Area = $4\pi r^2\ cm^2$.

Solution-#12 :-

Let square be of side 's' and circle be of radius 'r'

Length of wire = perimeter of square.

= perimeter of circle

$\Rightarrow \quad 5024 = 2\pi r = 4s \quad \& \quad s = \frac{5024}{4}$

$\Rightarrow \quad r = \frac{5024 \times 7}{2 \times 22} = 799.27 \quad \& \quad s = 1256.$

Area of square $A_1 = s^2 = (1256)^2$

Area of circle $A_2 = \pi r^2 = \frac{22}{7} \times \frac{5024 \times 7}{22} \times \frac{5024 \times 7}{22}$

$= \frac{(5024)^2 \times 7}{22}.$

$\frac{A_1}{A_2} = \frac{(1256)^2}{(5024)^2 \times \frac{22}{7}} = \frac{1}{16\pi}.$

Solution-13 :-

Radius of a circle = 14 cm

Area of a circle = πr^2

$= \frac{22}{7} \times 14 \times 14$

$= 22 \times 2 \times 14$

$= 22 \times 28$

$= 616\ cm^2$

double Area of a circle = $2(616)\ cm^2$

$= 1232\ cm^2$

$\therefore$ Radius of a circle = $\sqrt{\frac{A}{\pi}}$

$= \sqrt{\frac{1232}{\pi}}$

$= \sqrt{\frac{1232 \times 7}{22}}$

$= \sqrt{56 \times 7}$

$= 14\sqrt{2}\ cm$

$\therefore$ Radius = $14\sqrt{2}$ cm.

Solution-14:-

Given,

Radius of first circular field = 20m

1→ Area of a circular field = $\frac{22}{7} \times 20 \times 20$

$= \frac{22}{7} \times 400\ m^2$

$= \frac{8800}{7}\ m^2$

Radius of second circular field = 48 m

Area of second circular field = $\frac{22}{7} \times 48 \times 48$

$= \frac{50688}{7}\ m^2$

Area of Third circular field = Area ① + Area ②

$= \frac{8800}{7} + \frac{50688}{7}$

$= \frac{51488}{7}$

Radius of Third circular field = $\sqrt{\frac{A}{\pi}}$

$= \sqrt{\frac{51488}{7} \times \frac{7}{22}}$

$= \sqrt{(52)^2}$

∴ Radius of Third circular field = 52m.

Solution-15:-

Radius of first circular field = 5m.

Radius of Second circular field = 13m.

Area of a ① circular field = πr^2

$= \frac{22}{7} \times 5 \times 5\ m^2$

Area of 2nd circular field = πr^2

$= \frac{22}{7} \times 13 \times 13\ m^2$.

Area of 3rd circular field = Area ② - Area ①

$= \frac{22}{7}[13 \times 13 - 5 \times 5]$

$= \frac{22}{7}[169 - 25]$

$= \frac{22}{7} \times 144$

$= 3.14 \times 144$.

Radius of a circle = $\sqrt{\frac{A}{\pi}}$

$= \sqrt{\frac{3.14 \times 144}{3.14}} = \sqrt{144}$

$= 12\ m$

∴ Radius of Third circle = 12m.

Solution -16:-

Given we have,

Radius of first circle = R.

Diameter of ① circle = D

Diameter of ② circle = $\frac{2}{3}D$

Diameter of ③ circle = $\frac{1}{3}D$

Area of ① circle = $\frac{\pi D^2}{4}$

Area of ② circle = $\frac{\pi(\frac{2}{3}D)^2}{4}$

Area of ③ circle = $\frac{\pi(\frac{1}{3}D)^2}{4}$

∴ Area of shaded Region = Area ① − Area ② − Area ③

$= \frac{\pi D^2}{4} - \frac{\pi D^2}{9} - \frac{\pi D^2}{36}$

$= \frac{9\pi D^2 - 4\pi D^2 - \pi D^2}{36}$

$= \frac{4\pi D^2}{36}$

$= \frac{\pi D^2}{9}\ cm^2$

∴ Area of ashaded Region = $\frac{\pi \times 18 \times 18}{9} = 36\pi\ cm^2$.

Solution -17:-

Radius of the quarter circular plot = 2m

Area of quarter circular plot = $\frac{\pi}{4}(2)^2$

$= \pi m^2$

Area of the flower bed = πr^2 [∵ radius of flower bed = 2m]

$= \pi(2)^2$

$= 4\pi$

Area of the remaining field = Area of the Rectangular field − 4 × Area of Quarter Circular Plot − Area of flower bed

Area of Rectangular field = $8 \times 6\ m^2$

$= 48\ m^2$

Area of the Remaining field = $48\ m^2 - 4\pi m^2 - 4\pi m^2$

$= 48\ m^2 - 25.132\ 1$

$= 22.86\ m^2$

∴ Area of the Remaining field = $22.86\ m^2$.

Solution-18:-

Radius of a circle = 5cm.

Given that side of the square = 10cm

Required Area = Area of square ABCD - Area of 4 quadrants

$$= 10\times10 - 4\left(\frac{1}{4}\times\frac{22}{7}\times5^2\right)cm^2$$

$$= 100cm^2 - \frac{22\times25}{7}cm^2$$

$$= 21.43cm^2$$

Solution-19:-

Area of ① circle = πr^2

Area of ② circle = $100\pi r^2$

Radius of ① circle = r

Radius of ② circle = $\sqrt{\frac{A}{\pi}} = \sqrt{\frac{100\pi r^2}{\pi}} = \sqrt{100r^2}$

$= 10r.$

circumference of ① circle = $2\pi r$

circumference of ② circle = $2\pi(10r) = 20\pi r$

$$\frac{C_2}{C_1} = \frac{20\pi r}{2\pi r} = \frac{10}{1}. \quad \therefore C_2 : C_1 = 10:1$$