RD Sharma Solutions

Class 7

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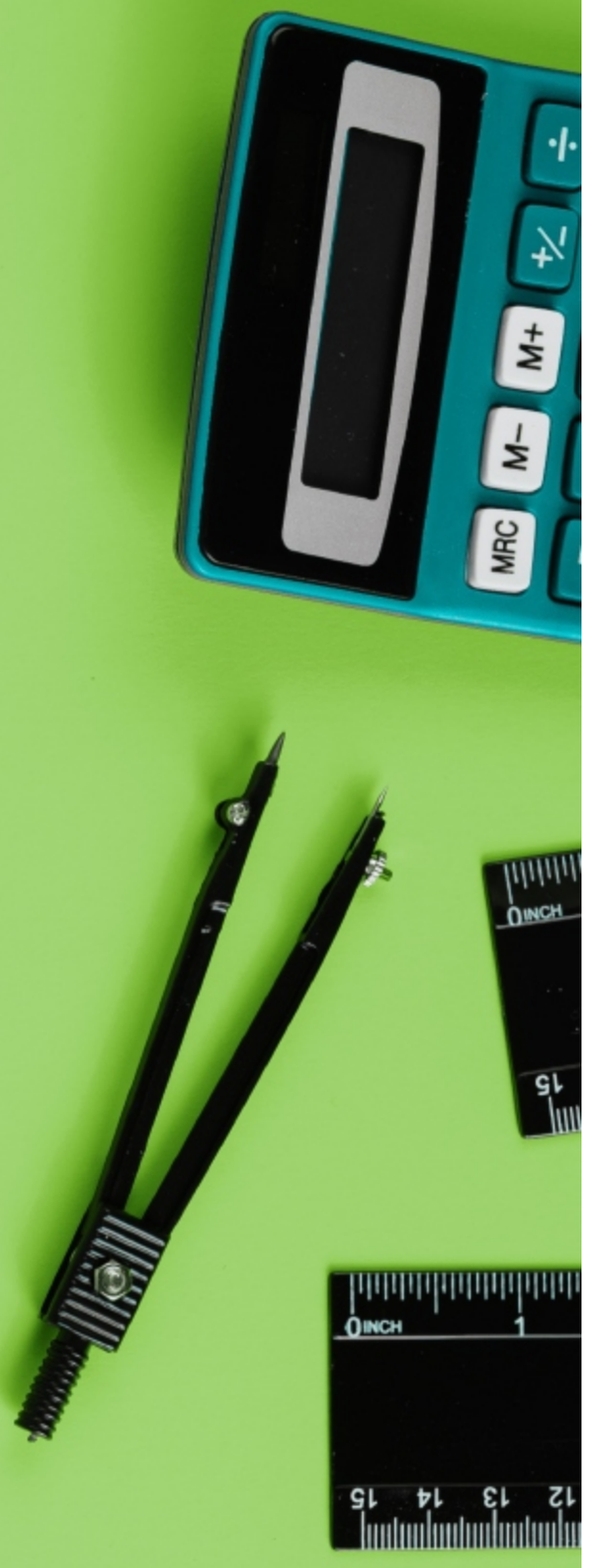

Chapter - 21

Mensuration - II (Area of circle)

Exercise 21.1

Q.1 Find the circumference of a circle whose radius is

(i) 14 cm (ii) 10 m (iii) 4 km

Solution: (i) $r = 14$ cm

Circumference $= 2\pi r$

$= 2 \times \frac{22}{7} \times 14 = 88$ cm

(ii) $r = 10$ m

$C = 2\pi r = 2 \times \frac{22}{7} \times 10 = \frac{440}{7}$ m $= 62.86$ m

(iii) $r = 4$ km

$C = 2\pi r = 2 \times \frac{22}{7} \times 4 = \frac{176}{7}$ km $= 25.142$ km

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Q.2 Find the circumference of a circle whose diameter is

(i) 7 cm (ii) 4.2 cm (iii) 11.2 km

Solution (i) Diameter $= 7$ cm

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

$\therefore$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times \frac{7}{2} = 22$ cm

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(ii) Diameter = 4.2 cm

radius $= \frac{4.2}{2} = 2.1$ cm

$\therefore$ Circumference $= 2 \times \frac{22}{7} \times 2.1 = 13.2$ cm

(iii) diameter = 11.2 km

radius $= \frac{11.2}{2} = 5.6$ km

$\therefore$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 5.6 = 35.2$ km

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Q.3 Find the radius of a circle whose circumference is-

(i) 52.8 cm (ii) 42 cm (iii) 6.6 km

Solution (i) here, Circumference = 52.8 cm

$\Rightarrow 2\pi r = 52.8$

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

$\Rightarrow r = \frac{52.8 \times 7}{2 \times 22} = 8.4$ cm

(ii) here, circumference = 42 cm

$\Rightarrow 2\pi r = 42$

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

$\Rightarrow r = \frac{42 \times 7}{2 \times 22} = 6.68$ cm

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(iii) Given Circumference = 6.6 Km

$$2\pi r = 6.6$$

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

$$\Rightarrow r = \frac{6.6 \times 7}{2 \times 22} = 1.05 \text{ Km}$$

Q4 Find the diameter of a circle whose circumference is -

(i) 12.56 cm (ii) 88 m (iii) 11.0 Km.

Solution: (i) here, circumference = 12.56 cm

$$\Rightarrow 2\pi r = 12.56$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 12.56$$

$$\Rightarrow r = \frac{12.56 \times 7}{2 \times 22} = 1.998 \text{ (Approx)}$$

$\therefore$ Diameter = 2 × radius

$= 2 \times 1.998 = 3.996$ (Approx).

(ii) here, circumference = 88 m

$$2\pi r = 88$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 88 \Rightarrow r = \frac{88 \times 7}{2 \times 22}$$

$$r = 14 \text{ cm}$$

$\therefore$ Diameter = 2 × radius

$= 2 \times 14$ cm $= 28$ cm

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(iii) here, circumference = 11.0 km

$$2\pi r = 11$$

$$2 \times \frac{22}{7} \times r = 11$$

$$\Rightarrow r = \frac{11 \times 7}{2 \times 22} = \frac{7}{4} \text{ km}$$

$\because$ Diameter = 2 × radius

$$= 2 \times \frac{7}{4} \text{ km} = \frac{7}{2} \text{ km} = 3.5 \text{ km}$$

Q.5 The ratio of the radii of two circles is 3:2. What is the ratio of their circumferences?

Solution: let $\frac{r_1}{r_2} = \frac{3}{2}$

then ratio of circumferences $\frac{C_1}{C_2} = \frac{2\pi r_1}{2\pi r_2} = \frac{r_1}{r_2}$

$$= \frac{3}{2}$$

here $C_1 : C_2 = 3:2$

Q.6 A wire in the form of a rectangle 18.7 cm long and 14.3 cm wide is reshaped and bent into the form of a circle. Find the radius of the circle so formed.

Sol: here, length of rectangle = 18.7 cm

breadth = 14.3 cm

let radius of circle = r cm

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$\because$ Circumference of circle = Perimeter of rectangle

$\Rightarrow 2\pi r = 2(l+b)$

$\Rightarrow 2 \times \frac{22}{7} \times r = 2(18.7 + 14.3)$

$\Rightarrow \frac{44}{7} r = 66$

$\Rightarrow r = \frac{66 \times 7}{44} = \frac{21}{2} = 10.5$ cm

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Q7 A piece of wire is bent in the shape of an equilateral triangle of each side 6.6 cm. It is rebent to form a circular ring. What is the diameter of the ring.

Solution: Let radius of circular ring = r cm.

Perimeter of equilateral triangle = Circumference of circular ring

$\Rightarrow 3 \times \text{side} = 2\pi r$

$\Rightarrow 3 \times 6.6 = 2 \times \frac{22}{7} \times r$

$\Rightarrow r = \frac{3 \times 6.6 \times 7}{2 \times 22} = \frac{6.3}{2}$ cm

$\therefore$ Diameter $= 2r$

$= 2 \times \frac{6.3}{2}$ cm $= 6.3$ cm

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Q.8 The diameter of wheel of a car is 63 cm. Find the distance travelled by the car during the period, the wheel makes 1000 revolutions.

Solution: Diameter of wheel = 63 cm

radius $= \frac{63}{2}$ cm

Distance travelled in one revolution

= Circumference of wheel

$= 2\pi r = 2 \times \frac{22}{7} \times \frac{63}{2} = 198$ cm

∴ Distance covered in 1000 revolutions $= 198 \times 1000$

$= 198000$ cm

$= \frac{198000}{100}$

$= 1980$ m.

Q.9 The diameter of wheel of a car is 98 cm. How many revolutions will it make to travel 6160 metres.

Solution: Diameter of wheel = 98 cm

radius $= \frac{98}{2}$ cm $= 49$ cm

∵ Distance covered in one revolution = Circumference

$= 2 \times \frac{22}{7} \times 49 = 308$ cm

Total Distance = 6160 metres.

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$\therefore$ No. of revolutions $= \frac{6160}{308} = 20$ revolutions.

Q.10 The moon is about 384400 km from the earth and its path around the earth is nearly circular. Find the circumference of the path described by the moon in lunar month.

Solution: The Distance of moon from earth = 384400 K

$\therefore$ radius of path = 384400 km.

Circumference of path described $= 2\pi r$

$= 2 \times \frac{22}{7} \times 384400$ 54914.29

$= 2416228.76$ km.

Q.11 How long will John take to make a round of circular field of radius 21 cm cycling at the speed of 8 km/hr.

Solution: here, radius of circular field = 21 cm

Distance covered to make one round

= Circumference of field

$= 2\pi r = 2 \times \frac{22}{7} \times 21 = 132$ cm

$= 1.32$ m

Speed $= 8$ km/h

$= \cancel{8}^{4} \times \frac{5}{\cancel{18}_{9}}$ m/sec $= \frac{20}{9}$ m/sec.

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$$\text{Time taken} = \frac{\text{Distance}}{\text{Speed}} = \frac{(1.32)}{20/9}$$

$$= \frac{1.32 \times 9}{20} = 59.4 \text{ second}$$

Q.12 The hour and minute hands of a clock are 4 cm and 6 cm long respectively. Find the sum of the distances travelled by their tips in 2 days.

Solution: length of hour hand = 4 cm

no. of revolutions make by hour hand in 2 days = 4.

$\therefore$ Distance travelled $= 4 \times 2\pi r$

$= 4 \times 2\pi \times 4 = 16\pi$

Now, length of minute hand = 6 cm.

no. of revolutions make by minute hand in 2 days

$= 48$

$\therefore$ Distance travelled $= 48 \times 2\pi r$

$= 48 \times 2 \times \pi \times 6 = 576\pi$

hence, Total Distance travelled $= 16\pi + 576\pi$

$= 592\pi$

$= 592 \times \frac{22}{7}$

$= 1910.8$ cm.

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Q.13 A rhombus has the same perimeter as the circumference of a circle. If the sides of the rhombus is 2.2m. Find the radius of circle.

Solution: $\because$ side of rhombus $= 2.2m$

$\because$ circumference of circle = Perimeter of rhombus.

$\Rightarrow \quad 2\pi r = 4 \times \text{side}$

$\Rightarrow \quad 2 \times \frac{22}{7} \times r = 4 \times 2.2$

$\Rightarrow \quad r = \frac{4 \times 2.2 \times 7}{2 \times 22} = 1.4m.$

Q.14 A wire is looped in the form of a circle of radius 28 cm. It is bent into a square form. Determine the length of the sides of the square.

Solution: radius of circle = 28 cm

$\because$ circumference of circle = Perimeter of square

$\Rightarrow \quad 2\pi r = 4a \qquad \{a = \text{side of square}\}$

$\Rightarrow \quad 2 \times \frac{22}{7} \times 28 = 4a$

$\Rightarrow \quad \frac{176}{4} = a \Rightarrow a = 44cm$

$\therefore$ side of square = 44 cm.

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Q.15 A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

Solution: Total distance covered = 11 km = 11000 m.

Total revolutions = 5000.

Let radius = r m.

$$5000 \times 2\pi r = 11000$$

$$\Rightarrow 5000 \times 2 \times \frac{22}{7} \times r = 11000$$

$$\Rightarrow r = \frac{11000 \times 7}{5000 \times 2 \times 22} = 0.35 \text{ m}$$

$$= 35 \text{ cm}.$$

$\therefore$ Diameter $= 2r$

$= 2 \times 35$ cm $= 70$ cm.

Q.16 A boy is cycling such that the wheels of the cycle are making 140 revolutions per minute. If the diameter of the wheel is 60 cm. Calculate the speed per hour with which the boy is cycling.

Solution: Diameter of wheel = 60 cm

radius $= \frac{60}{2}$ cm $= 30$ cm.

Distance cov. by wheel in 1 hour $= 140 \times 2\pi r \times 60$

$$= 140 \times 2 \times \frac{22}{7} \times 30 \times 6$$

$$= 1584000 \text{ cm}$$

$$= \frac{1584000}{100000} \text{ km} = 15.84 \text{ K}$$

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hence, Speed of cycling = 15.84 km/h.

Q.17 The diameter of the driving wheel of a bus is 140 cm. How many revolutions per minute must the wheel make in order to keep a speed of 66 km per hour?

Solution: Diameter of wheel = 140cm =

radius = $\frac{140}{2}$ cm = 70cm = 0.7 m.

Speed of bus = 66 km/hr

Distance covered by bus in 1 min = $\frac{66 \times 1000}{60}$ metre

= 1100 metre

Distance covered in one revolution = $2\pi r$

$= 2 \times \frac{22}{7} \times 0.7$

= 4.4 m.

hence

Number of revolutions = $\frac{1100}{4.4}$ = 250 revolution

Q.18 A water sprinkler in a lawn sprays water as far as 7m in all directions. Find the length of the outer edge of wet grass.

Solution: here radius = 7 m

length of outer edge = circumference of circle

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

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Q.19 A well of diameter 150 cm has a stone parapet around it. If the length of the outer edge of the parapet is 660 cm. Then Find the width of the parapet.

Solution: Inner diameter of well = 150 cm

Inner radius $= \frac{150}{2} = 75$ cm.

outer circumference = 660 cm

$\Rightarrow 2\pi r = 660$

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

$\Rightarrow r = \frac{660 \times 7}{2 \times 22} = 105$ cm.

$\therefore$ width of parapet = 105 cm − 75 cm

= 30 cm.

Q.20 An ox in a Kalhu (an old processing apparatus) is tethered to a rope 3 m long. How much distance does it cover in 14 rounds.

Solution: here length of rope = radius of circle

$\Rightarrow r = 3$ m.

Distance covered in 1 round $= 2 \times \frac{22}{7} \times 3 = \frac{132}{7}$ m

$\therefore$ Distance covered in 14 rounds $= \frac{132}{7} \times 14$

= 264 m

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