

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Chapter 11

MENSURATION

Exercise 11.1

1. Calculate the circumference of a circle when its diameter is:
(Take $\pi \approx \frac{22}{7}$).

(i) 56mm

$$\begin{aligned} \text{Ans. Circumference} &= \pi d \\ &= \frac{22}{7} \times 56 \\ &= 22 \times 8 = 176\text{mm} \end{aligned}$$

(ii) 4.9cm

$$\begin{aligned} \text{Ans. Circumference} &= \pi d \\ &= \frac{22}{7} \times 4.9 \\ &= 22 \times 0.7 = 15.4\text{cm} \end{aligned}$$

(iii) $\frac{21}{2}$ cm

$$\begin{aligned} \text{Ans. Circumference} &= \pi d \\ &= \frac{22}{7} \times \frac{21}{2} \\ &= 11 \times 3 = 33\text{cm} \end{aligned}$$

(iv) 70m

$$\begin{aligned} \text{Ans. Circumference} &= \pi d \\ &= \frac{22}{7} \times 70 \\ &= 22 \times 10 = 220\text{m} \end{aligned}$$

(v) 0.98m

$$\begin{aligned} \text{Ans. Circumference} &= \pi d \\ &= \frac{22}{7} \times 0.98 \\ &= 22 \times 0.14 = 3.08\text{m} \end{aligned}$$

(vi) $3\frac{1}{2}$ cm

$$\text{Ans. } 3\frac{1}{2}\text{ cm} = \frac{7}{2}\text{ cm}$$

$$\begin{aligned} \text{Circumference} &= \pi d \\ &= \frac{22}{7} \times \frac{7}{2} = 11\text{cm} \end{aligned}$$

2. Calculate the circumference of a circle with the following radius.
(Take $\pi \approx \frac{22}{7}$)

(i) 7cm

$$\begin{aligned} \text{Ans. Circumference} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 7 \\ &= 44\text{cm} \end{aligned}$$

(ii) 10.5cm

$$\begin{aligned} \text{Ans. Circumference} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 10.5 \\ &= 66\text{cm} \end{aligned}$$

(iii) $\frac{15}{4}$ cm

$$\begin{aligned} \text{Ans. Circumference} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times \frac{15}{4} \\ &= \frac{165}{7} = 23.57\text{cm} \end{aligned}$$

(iv) $4\frac{2}{3}$ cm

$$\begin{aligned} \text{Ans. } 4\frac{2}{3}\text{ cm} &= \frac{14}{3}\text{ cm} \\ \text{Circumference} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times \frac{14}{3} \\ &= \frac{88}{3} = 29.33\text{cm} \end{aligned}$$

(v) 140mm

$$\text{Ans. Circumference} = 2\pi r$$

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

$$= 880\text{m}$$

(vi) $\frac{125}{44} \text{ m}$

Ans. Circumference = $2\pi r$

$$= 2 \times \frac{22}{7} \times \frac{125}{144}$$

$$= \frac{125}{7} = 17.86\text{m}$$

3. Find the radius and diameter of each of the following circles when circumference is:

(i) 110mm

Ans. Hence $C = 110\text{mm}$

$$2\pi r = 110$$

$$2 \times \frac{22}{7} \times r = 110$$

$$r = 110 \times \frac{7}{22 \times 2}$$

$$r = 17.5\text{cm}$$

$$\text{Diameter} = 2r = 2 \times 17.5 = 35\text{cm}$$

(ii) 33cm

Ans. Hence $C = 33\text{cm}$

$$2\pi r = 33$$

$$2 \times \frac{22}{7} \times r = 33$$

$$r = 33 \times \frac{7}{22 \times 2}$$

$$r = \frac{21}{4}$$

$$r = 5.25\text{cm}$$

$$\text{Diameter} = 2r = 2(5.25) = 10.5\text{cm}$$

(iii) 17.6cm

Ans. Hence $C = 17.6\text{cm}$

$$2\pi r = 17.6$$

$$2 \times \frac{22}{7} \times r = 17.6$$

$$r = 17.6 \times \frac{7}{22 \times 2}$$

$$r = 2.8\text{cm}$$

$$\text{Diameter} = 2r = 2 \times 2.8 = 5.6\text{cm}$$

(iv) $8\frac{4}{5} \text{ m}$

Ans. $8\frac{4}{5} \text{ m} = \frac{44}{5} \text{ m}$

$$\text{Hence } C = \frac{44}{5} \text{ m}$$

$$2\pi r = \frac{44}{5}$$

$$2 \times \frac{22}{7} \times r = \frac{44}{5}$$

$$r = \frac{44}{5} \times \frac{7}{22 \times 2}$$

$$r = \frac{7}{5} \text{ or } 1\frac{2}{5} \text{ m}$$

$$\text{Diameter} = 2r = 2 \times \frac{7}{5} = \frac{14}{5} \text{ or } 2\frac{4}{5} \text{ m}$$

(v) $\frac{77}{9} \text{ cm}$

Ans. Hence $C = \frac{77}{9}$

$$2\pi r = \frac{77}{9}$$

$$2 \times \frac{22}{7} \times r = \frac{77}{9}$$

$$r = \frac{77}{9} \times \frac{7}{22 \times 2}$$

$$r = \frac{49}{36}$$

$$r = 1.36\text{cm}$$

$$\text{Diameter} = 2r = 2 \times 1.36 = 2.72\text{cm}$$

(vi) 140mm

Ans. Hence $C = 140\text{mm}$

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$$2\pi r = 140$$

$$2 \times \frac{22}{7} \times r = 140$$

$$r = 140 \times \frac{7}{22 \times 2}$$

$$r = \frac{980}{44}$$

$$r = 22.27\text{mm}$$

$$\text{Diameter} = 2r = 2 \times 22.27 = 44.54\text{cm}$$

4. *The length of a minute hand of a wall-clock is 10.5cm. Find the distance covered by tip of minute hand in 2 hours.*

Ans. Circumference = $2\pi r$
 $= 2 \times \frac{22}{7} \times 10.5$
 $= 66$

Distance covered in one hours = 66cm

in two hours = $2 \times 66 = 132\text{cm}$

5. *A horse is tethered by a rope of length 7m tied other end with a pole.*

- (i) *Find the distance covered by the horse in one revolution.*
 (ii) *Find the number of revolutions if horse covers a distance of 528m.*

Ans. Circumference = $2\pi r$
 $= 2 \times \frac{22}{7} \times 7 = 44\text{m}$

Distance covered in one revolution = 44m

No. of revolution in = $\frac{528}{44} = 12$ revolution

6. *A wheel of a radius 21cm moves 15 revolutions in one minute.*

- (i) *Find the circumference of the wheel.*
 (ii) *Find distance covered by the wheel in 50 minutes if it revolves at the same rate.*

Ans. Radius of wheel = 21cm

(i) Circumference = $2\pi r$
 $= 2 \times \frac{22}{7} \times 21$
 $= 132\text{cm}$

(ii) No. of revolution in one minute = 15
 50 minute = $15 \times 50 = 750$

Distance covered in one revolution = 132cm

750 revolution = 750×132
 $= 99000\text{cm} = 990\text{m}$

7. *An athlete covers a distance of 3960m in 12 rounds while running on a circular track.*

- (i) *Find the distance covered in one round.*
 (ii) *Find the radius of the circular track.*

Ans. Distance in 12 round = 3960m

(i) Distance in one round = $\frac{3960}{12} = 330\text{m}$

(ii) Circumference = 330m
 $2\pi r = 330$

$$2 \left(\frac{22}{7} \right) r = 330$$

$$r = 330 \times \frac{7}{2 \times 22} = 52.5\text{m}$$

8. *A disc covers 220cm distance in 5 revolutions. Find the diameter of the disc.*

Ans. Distance covered in 5 revolution
 $= 220\text{cm}$

One revolution = $\frac{220}{5} = 44\text{cm}$

Circumference = 44cm

$$2\pi r = 44\text{cm}$$

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

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- $r = \frac{44 \times 7}{2 \times 22}$
 $r = 7\text{cm}$
 Diameter = $2r = 2 \times 7 = 14\text{cm}$
9. Diameter of a circular garden is 280m.
- (i) What is the circumference of the garden?
- (ii) What is the cost of a barbed wire around the garden at the rate of Rs. 7 per metre?
- (iii) If we have another wire costing Rs. 10560 in total, what should be the rate per metre?

Ans. Diameter of garden = 280m

- (i) Circumference = πd
 $= \frac{22}{7} \times 280 = 880\text{m}$
- (ii) Cost of a barbed wire Rs. 7 perimeter
 $= 7 \times 880 = \text{Rs. } 6160$
- (iii) Total costing of another wire
 $= \text{Rs. } 10560$

$$\text{Cost per meter} = \frac{10560}{880} = \text{Rs. } 12$$

10. Diameter of a circular flower bed is 4.2m.
- (i) Calculate the circumference of the bed.
- (ii) Find the circumference of five such beds.

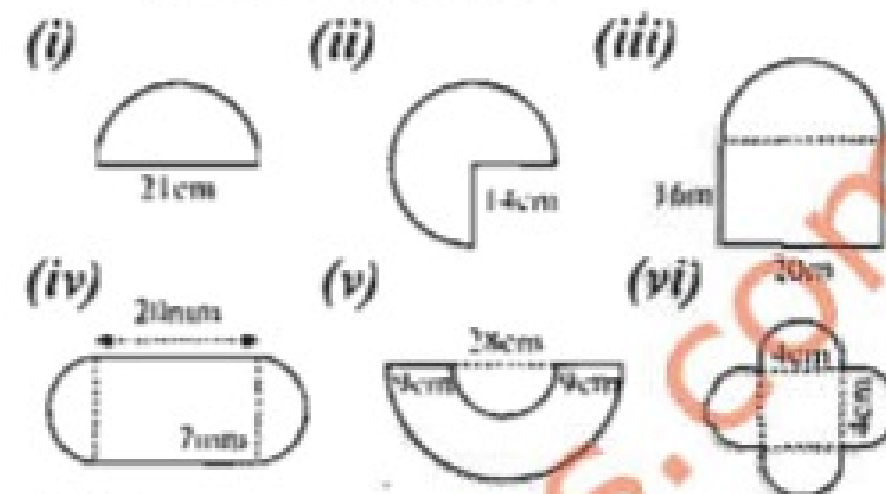
Ans. Diameter of flower bed = 4.2cm

$$\text{Radius } r = \frac{4.2}{2} \times 2.1\text{cm}$$

$$\begin{aligned}\text{Circumference} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 2.1 \\ &= 13.2\text{cm}\end{aligned}$$

$$\begin{aligned}\text{Circumference of 5 bed} &= 5 \times 13.2 \\ &= 66.0\text{cm}\end{aligned}$$

11. Find the perimeter of each of the following shapes.



Ans.

- (i) Diameter of circle = 21cm
 Circumference of circle = πd
 $= \frac{22}{7} \times 21$
 $= 66\text{cm}$
 Perimeter = circumference of half circle
 $+ \text{diameter}$
 $= 33 + 21 = 54\text{cm}$
- (ii) Radius of circle = 14cm
 Circumference of circle = $2\pi r$
 $= 2 \times \frac{22}{7} \times 14$
 $= 88\text{cm}$
 Fourth part of circle = $\frac{88}{4} = 22\text{cm}$
 Perimeter of 3rd part of circle = $66\text{cm} + 14 + 14$
 $= 94\text{cm}$
- (iii) Perimeter of rectangle = $2(l + w)$
 $= 20 + 16 + 16$
 $= 52\text{cm}$
 Diameter of circle = 20cm
 Circumference of half circle = $\frac{\pi}{2} \times d$
 $= \frac{22}{7} \times \frac{20}{2}$
 $= 31.428\text{cm}$

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Total perimeter = $52 + 31.43 = 83.43\text{cm}$

(iv) Diameter of circle = 7mm

$$\begin{aligned}\text{Circumference of circle} &= \pi d \\ &= \frac{22}{7} \times 7 \\ &= 22\text{mm}\end{aligned}$$

Perimeter of 2 sides of rectangle = $20 + 20 = 40\text{mm}$

Total perimeter = $22 + 40 = 62\text{mm}$

(v) Diameter of big circle = 28cm

$$\begin{aligned}\text{Circumference of big half circle} &= \frac{\pi}{2} \times d \\ &= \frac{22}{7} \times \frac{28}{2} \\ &= 44\text{cm}\end{aligned}$$

Perimeter of big circle = $44 + 9 + 9 = 62\text{cm}$

Diameter of small circle = $28 - 18 = 10\text{cm}$

$$\begin{aligned}\text{Circumference of small half circle} &= \frac{\pi}{2} \times 10 \\ &= \frac{22}{7 \times 2} \times 10 = 15.71\end{aligned}$$

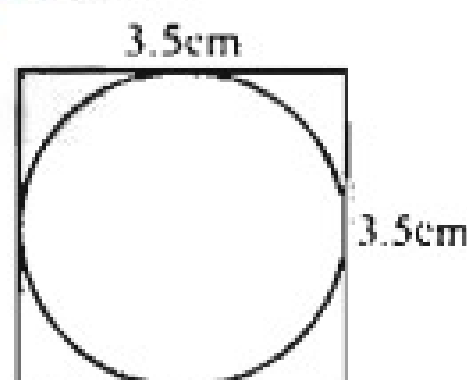
Total perimeter = $62\text{cm} + 15.71\text{cm} = 77.71\text{cm}$

(vi) Diameter of circle = 4cm

Circumference of one half circle = $\frac{\pi}{2} \times d$

$$\begin{aligned}4 \text{ half circle} &= \frac{\pi}{2} \times d \times 4 \\ &= \frac{\pi}{2} \times 4 \times 4 = 8\pi \text{ cm}\end{aligned}$$

12. Find the circumference of the given circle:



Ans. Diameter of circle = 3.5cm

$$\begin{aligned}\text{Circumference} &= \pi d \\ &= \frac{22}{7} \times 3.5 = 11\text{cm}\end{aligned}$$

Exercise 11.2

1. Convert

(i) 8cm^2 to mm^2

Ans. $1\text{cm} = 10\text{mm}$
 $1\text{cm}^2 = 10 \times 10\text{mm}^2$
 $8\text{cm}^2 = 8 \times 10 \times 10 = 800\text{mm}^2$

(ii) 75cm^2 to m^2

Ans. $1\text{cm} = 0.01\text{m}$
 $1\text{cm}^2 = 0.1 \times 0.01\text{m}^2$
 $75\text{cm}^2 = 75 \times 0.01 \times 0.01\text{m}^2$
 $= 75 \times \frac{1}{100} \times \frac{1}{100} \text{m}^2$
 $= \frac{75}{10000} = 0.0075\text{m}^2$

(iii) 500mm^2 to m^2

Ans. $1\text{mm} = 0.001\text{m}$
 $1\text{mm}^2 = 0.001 \times 0.001\text{m}^2$
 $500\text{mm}^2 = 500 \times 0.001 \times 0.001$
 $= 500 \times \frac{1}{1000} \times \frac{1}{1000}$
 $= \frac{5}{10000} = 0.0005\text{m}^2$

(iv) 7m^2 to mm^2

Ans. $1\text{m} = 1000\text{mm}$
 $1\text{m}^2 = 1000 \times 1000\text{mm}^2$
 $7\text{m}^2 = 7 \times 1000 \times 1000\text{mm}^2$
 $= 7000000\text{mm}^2$

(v) 12.5cm^2 to m^2

Ans. $1\text{cm} = 0.01\text{m}$
 $1\text{cm}^2 = 0.01 \times 0.01\text{m}^2$

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$$\begin{aligned} 12.5\text{cm}^2 &= 12.5 \times 0.01 \times 0.01\text{m}^2 \\ &= \frac{125}{10} \times \frac{1}{100} \times \frac{1}{100}\text{m}^2 \\ &= \frac{125}{100000}\text{m}^2 \\ &= 0.00125\text{m}^2 \end{aligned}$$

(vi) 850m^2 to km^2

Ans. $1\text{m}^2 = \frac{1}{1000}\text{km}^2$

$$1\text{m}^2 = \frac{1}{1000} \times \frac{1}{1000}\text{km}^2$$

$$\begin{aligned} 850\text{m}^2 &= 850 \times \frac{1}{1000} \times \frac{1}{1000} \\ &= \frac{850}{1000 \times 1000} \\ &= 0.00085\text{km}^2 \end{aligned}$$

2. Find the area of the circles when the radii are given as:

(i) 21cm

Ans. Area = πr^2
 $= \frac{22}{7} (21)^2 = 1386\text{cm}^2$

(ii) 3.6cm

Ans. Area = πr^2
 $= \frac{22}{7} (3.6)^2 = 40.73\text{cm}^2$

(iii) $2\frac{6}{11}\text{m}$

Ans. $2\frac{6}{11}\text{m} = \frac{28}{11}\text{m}$

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \frac{22}{7} \left(\frac{28}{11} \right)^2 \\ &= \frac{22}{7} \times \frac{784}{121} \\ &= \frac{17248}{847} = 20.36\text{m}^2 \end{aligned}$$

3. Calculate the radius and diameter of the circle having an area of:

(i) 154m^2

Ans. Area = 154m^2

$$\pi r^2 = 154$$

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

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

$$r^2 = 49$$

$$\sqrt{r^2} = \sqrt{49}$$

$$r = 7\text{cm}$$

$$\text{Diameter} = 2r = 2 \times 7 = 14\text{cm}$$

(ii) 28.26cm^2

Ans. Area = 28.26cm^2

$$\pi r^2 = 28.26$$

$$\frac{22}{7} \times r^2 = 28.26$$

$$r^2 = \frac{28.26 \times 7}{22}$$

$$r^2 = \frac{197.61}{22}$$

$$r^2 = 8.98$$

$$\sqrt{r^2} = \sqrt{8.98}$$

$$r = 3\text{cm}$$

$$\text{Diameter} = 2r = 2 \times 3 = 6\text{cm}$$

4. Complete the following table.

S.No.	π	Radius	Diameter	Circumference	Area
(i)	$\frac{22}{7}$	7cm			
(ii)	$\frac{22}{7}$		28m		
(iii)	3.14			31.4m	
(iv)	$3\frac{1}{7}$		$3\frac{2}{11}\text{cm}$		
(v)	$\frac{22}{7}$			$6\frac{2}{7}\text{cm}$	
(vi)	3.14				12.56m^2
(vii)	3.14				78.50m^2

Ans.

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S.No.	π	Radius	Diameter	Circumference	Area
(i)	$\frac{22}{7}$	7cm	14	44	154m^2
(ii)	$\frac{22}{7}$	14cm	28m	88cm	616m^2
(iii)	3.14	5	10	31.4m	78.5m^2
(iv)	$3\frac{1}{7}$	$1\frac{13}{22}$ cm	$3\frac{2}{11}$ cm	10cm	7.95m^2
(v)	$\frac{22}{7}$	1cm	2cm	$6\frac{2}{7}$ cm	πcm^2
(vi)	3.14	2m	4m	12.56cm	12.56m^2
(vii)	3.14	5m	10m	31.4cm	78.50m^2

5. A circular flower bed has a diameter 84cm. Find its area.

Ans. Diameter = 84cm

$$\text{Radius} = \frac{84}{2} = 42\text{cm}$$

$$\begin{aligned}\text{Area} &= \pi r^2 \\ &= \frac{22}{7} (42)^2 = \frac{22}{7} \times 1764 \\ &= 22 \times 252 = 5544\text{cm}^2\end{aligned}$$

6. Area covered by a circular window is 616m^2 . Find

(i) radius

(ii) circumference of the window

Ans. Area = 616m^2

$$\pi r^2 = 616\text{m}^2$$

$$\frac{22}{7} \times r^2 = 616$$

$$r^2 = \frac{616 \times 7}{22}$$

$$r^2 = \frac{4312}{22}$$

$$r^2 = 196$$

$$\sqrt{r^2} = \sqrt{196}$$

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

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

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

$$= 88\text{m}$$

7. Circumference of a circle is 6.28 metre.

(i) Find the diameter of circle.

(ii) Find the area of circle.

Ans. Circumference = 6.28m

$$2\pi r = 6.28$$

$$2 \times \frac{22}{7} \times r = 6.28$$

$$r = 6.28 \times \frac{7}{2 \times 22}$$

$$r = \frac{43.96}{44}$$

$$r = 1$$

$$\text{Diameter} = 2r = 2 \times 1 = 2\text{m}$$

$$\begin{aligned}\text{Area} &= \pi r^2 \\ &= \frac{22}{7} (1)^2 = \frac{22}{7}\end{aligned}$$

$$\text{or } 3.14\text{m}^2$$

8. Diameter of the base of a right circular conical tent is 24m.

(i) Calculate area of the base.

(ii) Find the cost of spreading carpet at the rate of Rs. 10 per square metre.

Ans. Diameter of the base = 24m

$$\text{Radius} = \frac{24}{2} = 12\text{m}$$

$$\begin{aligned}\text{Area} &= \pi r^2 \\ &= \frac{22}{7} (12)^2 \\ &= \frac{22}{7} \times 144 = 452.57\text{m}^2\end{aligned}$$

$$\begin{aligned}\text{Cost of carpet at the rate Rs. 10} &= 452.57 \times 10 \\ &= \text{Rs. } 4525.7\end{aligned}$$

9. Radius of a circular stage is 5m. What is the cost of cementing the

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stage at the rate of Rs. 100 per square metre.

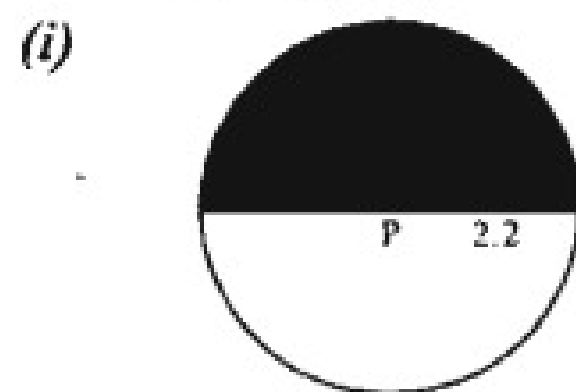
Ans. Radius of stage = 5m

$$\begin{aligned}\text{Area of stage} &= \pi r^2 \\ &= \frac{22}{7} \times (5)^2 \\ &= \frac{22}{7} \times 25 \\ &= \frac{550}{7} = 78.57\text{m}^2\end{aligned}$$

Rate of cementing = Rs. 100

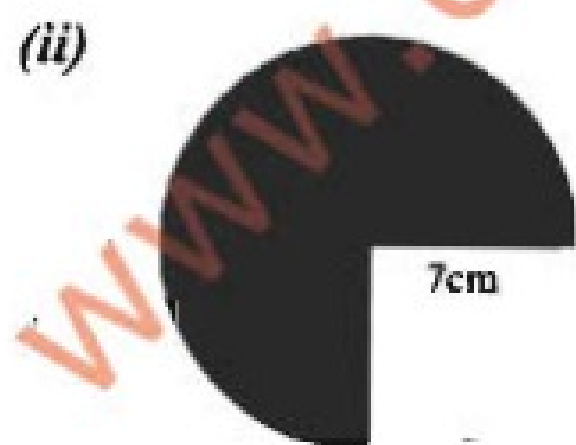
Cost of cementing = $78.57 \times 100 = \text{Rs. } 7857$

10. Find the area of the shaded regions (all measurements are in centimeters).



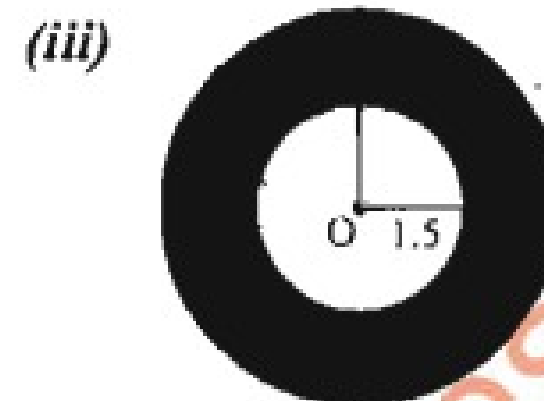
Ans. Area of half circle = $\frac{\pi}{2} r^2$

$$\begin{aligned}&= \frac{22}{7 \times 2} \times (2.2)^2 \\ &= \frac{11}{7} \times 4.84 \\ &= \frac{53.24}{7} = 7.6\text{cm}^2\end{aligned}$$



Ans. Area of $\frac{3}{4}$ circle = $\frac{3}{4} \pi r^2$

$$\begin{aligned}&= \frac{3}{4} \times \frac{22}{7} \times (7)^2 \\ &= \frac{3}{4} \times \frac{22}{7} \times 49 \\ &= \frac{231}{2} = 115.5\text{cm}^2\end{aligned}$$



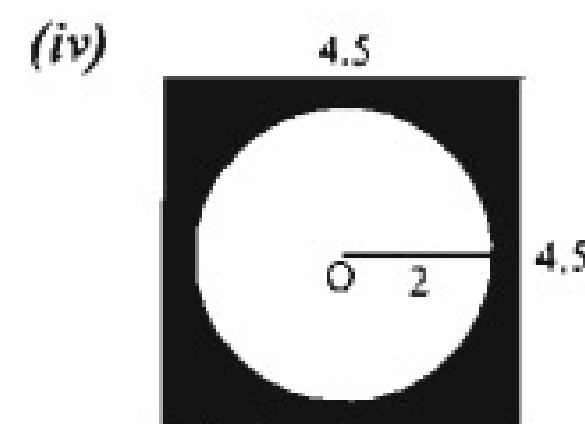
Ans. Area of big circle = πr^2

$$\begin{aligned}&= \frac{22}{7} \times (2.5)^2 \\ &= \frac{22}{7} \times 6.25 \\ &= \frac{137.5}{7} \\ &= 19.64\text{cm}^2\end{aligned}$$

Area of small circle = πr^2

$$\begin{aligned}&= \frac{22}{7} \times (1.5)^2 \\ &= \frac{22}{7} \times 2.25 \\ &= \frac{49.5}{7} = 7.07\end{aligned}$$

Shaded area = $19.64 - 7.07 = 12.57\text{cm}^2$



Ans. Area of square = $l \times l$

$$\begin{aligned}&= 4.5 \times 4.5 \\ &= 20.25\text{cm}^2\end{aligned}$$

Area of circle = πr^2

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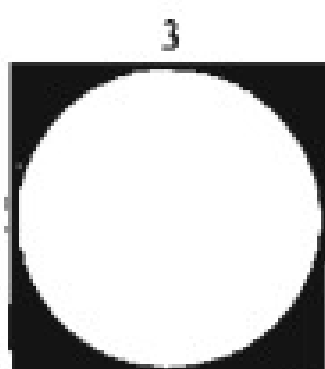
$$= \frac{22}{7} \times (2)^2$$

$$= \frac{22}{7} \times 4 = \frac{88}{7}$$

$$= 12.57\text{cm}^2$$

$$\text{Area of shaded area} = 20.25 - 12.57 = 7.68\text{cm}^2$$

(v)



Ans. Area of square = $l \times l$

$$= 3 \times 3 = 9\text{cm}^2$$

Area of circle = πr^2

Radius of circle = $\frac{3}{2} = \frac{22}{7} \times (1.5)^2$

$$= \frac{22}{7} \times 2.25$$

$$= \frac{49.5}{7}$$

$$= 7.07\text{cm}^2$$

$$\text{Area of shaded region} = 9 - 7.07 = 1.93\text{cm}^2$$

(vi)



Ans. Area of circle = πr^2

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

Area of circle = πr^2

$$= \frac{22}{7} \times 5 \times 5 = 78.57\text{cm}^2$$

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times 6 \times 8$$

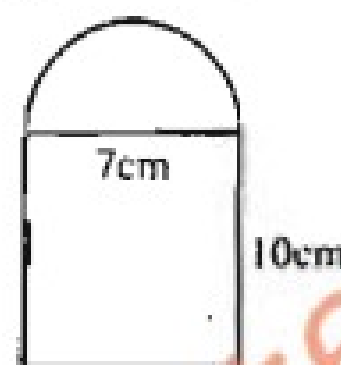
$$= 3 \times 8 = 24\text{cm}^2$$

$$\text{Area of shaded region} = 78.57 - 24$$

$$= 54.57\text{cm}^2$$

11. Find the area of each of the following shapes.

(i)



Ans. Area of rectangle = side $\times$ side

$$= 7 \times 10$$

$$= 70\text{cm}^2$$

Area of semi circle = $\frac{\pi}{2} r^2$

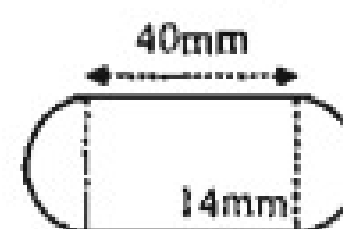
$$= \frac{22}{7} \times \frac{(3.5)^2}{2}$$

$$= \frac{11}{7} \times 12.25$$

$$= 19.25\text{cm}^2$$

Total area = $70 + 19.25 = 89.25\text{cm}^2$

(ii)



Ans. Area of rectangle = side $\times$ side

$$= 40 \times 14$$

$$= 560\text{cm}^2$$

Area of semi circle = πr^2

$$= \frac{22}{7} \times \left(\frac{14}{2}\right)^2$$

$$= \frac{22}{7} \times 49$$

$$= 22 \times 7$$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

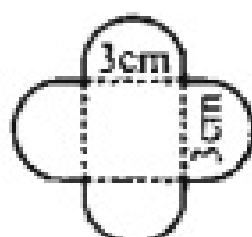
$$= 154\text{mm}^2$$

$$\text{Area of two semi circle} = 2 \times 154 = 308\text{cm}^2$$

$$\text{Total area} = 560 + 308 = 868$$

$$\text{Total area of cylinder} = 2 \times 868 = 1736\text{cm}^2$$

(iii)



$$\text{Ans. Area of square} = \text{side} \times \text{side}$$

$$= 3 \times 3 = 9\text{cm}^2$$

$$\text{Area of semi circle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \left(\frac{3}{2}\right)^2$$

$$= \frac{22}{7} \times (1.5)^2$$

$$= \frac{22}{7} \times 2.25$$

$$= 7.07$$

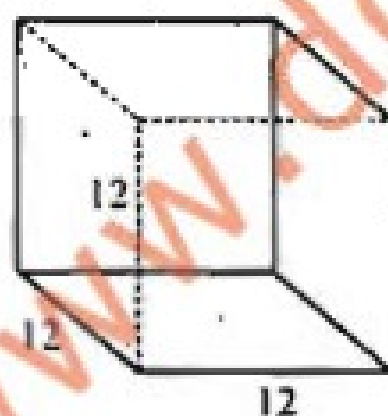
$$\text{Area of 4 semi circle} = 4 \times 7.07 = 28.28\text{cm}^2$$

$$\text{Total area} = 9 + 28.28 = 37.28\text{cm}^2$$

Exercise 11.3

1. Find the surface area of following prisms (all measurements are in centimetres):

(i)



$$\text{Ans. Surface area of any prism} = 2 \times \text{base area} + \text{base perimeter} \times \text{height}$$

$$\text{length} = 12\text{cm}, \text{ width} = 12\text{cm}, \text{ height} = 12\text{cm}$$

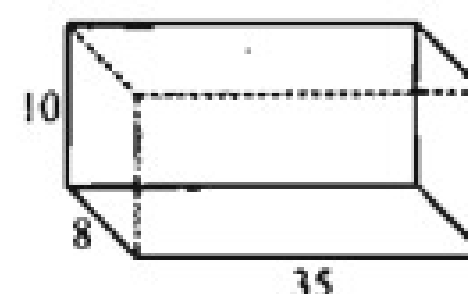
$$\text{Surface area} = 2(12 \times 12) + 4 \times 12 \times 12$$

$$= 2(144) + 48 \times 12$$

$$= 288 + 576$$

$$= 864\text{cm}^2$$

(ii)



$$\text{Ans. length} = 35\text{cm}, \text{ width} = 8\text{cm}, \text{ height} = 10\text{cm}$$

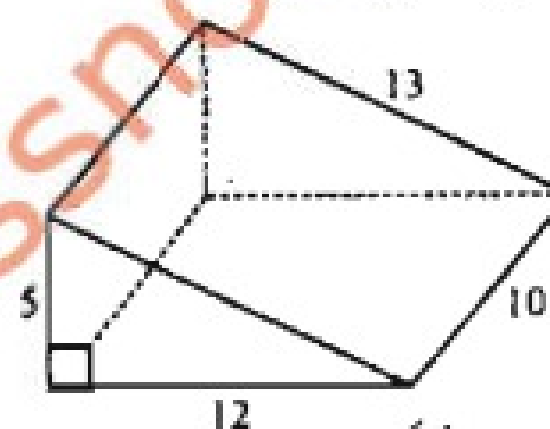
$$\text{Surface area} = 2(l \times w) + 2(l + w) \times h$$

$$= 2(35 \times 8) + 2(35 + 8) \times 10$$

$$= 2(280) + 2(43) \times 10$$

$$= 560 + 86 \times 10 = 1420\text{cm}^2$$

(iii)



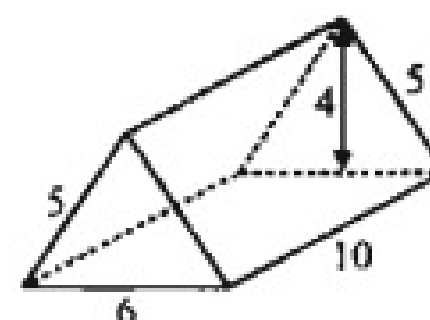
$$\text{Ans. Surface area} = 2 \left(\frac{1}{2} \times 12 \times 5 \right)$$

$$+ (12 + 5 + 13) \times 10$$

$$= 60 + 30 \times 10$$

$$= 360\text{cm}^2$$

(iv)



$$\text{Ans. Surface area of right triangular prism}$$

$$= \text{area of end faces} + \text{area of side faces}$$

$$\left(\frac{1}{2} ah + \frac{1}{2} ah \right) + a l + b l + c l$$

$$2 \times \frac{1}{2} (ah) + (a + b + c) l$$

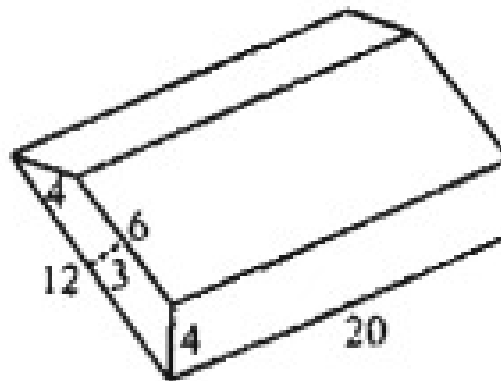
$$a = 6\text{cm}, b = 8\text{cm}, c = 10\text{cm}, h = 4\text{cm}, l = 10\text{cm}$$

$$\text{Surface area} = 2 \times \frac{1}{2} (6 \times 4) + (6 + 8 + 10) 10$$

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$$= 24 + 160 = 184\text{cm}^2$$

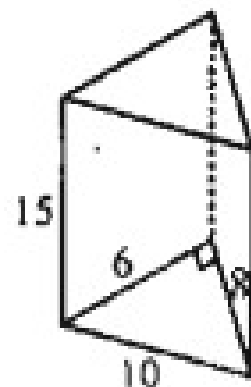
(v)



Ans. $a = 12\text{cm}$, $b = 4\text{cm}$, $c = 6\text{cm}$,
 $d = 4\text{cm}$, $h = 20\text{cm}$

$$\begin{aligned}\text{Surface area} &= 2 \times \text{base area} \\ &\quad + \text{base perimeter} \times \text{height} \\ &= 2 \left(\frac{12+6}{2} \right) \times 3 + (12+4+6+4) \times 20 \\ &= 18 \times 3 + 26 \times 20 \\ &= 54 + 520 = 574\text{cm}^2\end{aligned}$$

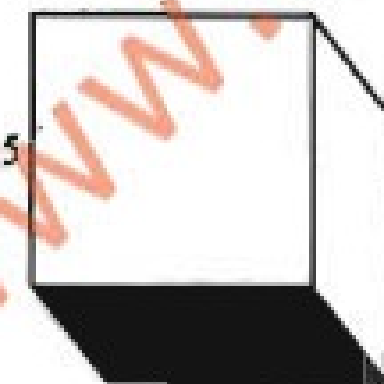
(vi)



Ans. $a = 8\text{cm}$, $b = 6\text{cm}$, $c = 10\text{cm}$,
 $h = 15\text{cm}$

$$\begin{aligned}\text{Surface area} &= 2 \times \text{base area} \\ &\quad + \text{base perimeter} \times \text{height} \\ &= 2 \left(\frac{8+6}{2} \right) + (8+6+10) \times 15 \\ &= 14 + 360 = 374\text{cm}^2\end{aligned}$$

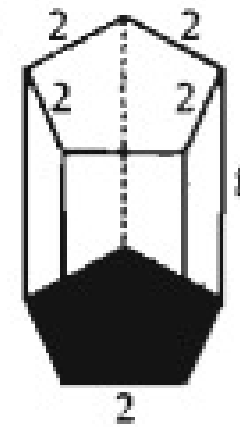
(vii)



Ans. $a = 5\text{cm}$, $h = 5\text{cm}$, $l = 5\text{cm}$
Surface area = 6 sides
Area of one side = 25cm^2

$$\text{Surface area of 6 sides} = 6 \times 25 = 150\text{cm}^2$$

(viii)



Ans. Surface area = 2 base area
+ base perimeter $\times$ height

$$\begin{aligned}&= 2 (40\text{cm}^2) + (2+2+2+2+2+2) \times 8 \\ &= 80\text{cm}^2 + 16 \times 8 \\ &= 80\text{cm}^2 + 128\text{cm}^2 \\ &= 208\text{cm}^2\end{aligned}$$

2. Find the surface area of a closed rectangular prism with the dimensions 12cm, 8cm and 10cm.

Ans. $a = 12\text{cm}$, $b = 8\text{cm}$, $c = 10\text{cm}$
Surface area of closed rectangular prism

$$\begin{aligned}&= 2(ab + bc + ca) \\ &= 2(12 \times 8 + 8 \times 10 + 10 \times 12) \\ &= 2(96 + 80 + 120) \\ &= 2(296) = 592\text{cm}^2\end{aligned}$$

3. A rectangular box open from the top is 8cm long, 6cm wide and 10cm high. What is the area of its surface?

Ans. $a = 8\text{cm}$, $b = 6\text{cm}$, $c = 10\text{cm}$
Surface area of box open from top

$$\begin{aligned}&= ab + 2bc + 2ca \\ &= 8 \times 6 + 2 \times 6 \times 10 + 2 \times 10 \times 8 \\ &= 48 + 120 + 160 = 328\text{cm}^2\end{aligned}$$

4. Salma wants to make an open rectangular cardboard box with base area 30cm by 20cm and a

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height of 12cm. What is the area of card-board needed?

Ans. $a = 30\text{cm}$, $b = 20\text{cm}$, $c = 12\text{cm}$
 Surface area of open card board box
 $= ab + 2bc + 2ca$
 $= (30)(20) + 2(20 \times 12) + 2(12 \times 20)$
 $= 600 + 480 + 720 = 1800\text{cm}^2$

5. A room made of bricks is 7m long, 6m wide and 5m high.

(i) Find the inner surface area of the walls.

(ii) Find the cost of tiling the walls @ Rs. 500 per square metre.

Ans. Length of wall = 7m
 Width of wall = 6m
 Height of wall = 5m
 Area of 2 wall = $2 \times 7 \times 5 = 70\text{m}^2$
 Area of 2 wall = $2 \times 6 \times 5 = 60\text{m}^2$
 Total area = $70 + 60 = 130\text{m}^2$
 Cost of tiling per $\text{m}^2 = \text{Rs. } 500$
 Cost of tiling $130\text{m}^2 = 500 \times 130$
 $= \text{Rs. } 65000$

6. A rectangular prism shaped paper weight made of glass has dimensions 3cm × 3cm × 4cm.

(i) What is the surface area of the prism?

(ii) What is the cost of polishing it @ Rs. 5 per cm^2 ?

Ans. $a = 3\text{cm}$, $b = 3\text{cm}$, $c = 4\text{cm}$
 Surface area = $2(ab + bc + ca)$
 $= 2(3 \times 3 + 3 \times 4 + 4 \times 3)$
 $= 2(9 + 12 + 12)$
 $= 2(33) = 66\text{cm}^2$
 Cost of polishing per $\text{cm}^2 = \text{Rs. } 5$

$$66\text{cm}^2 = 5 \times 66\text{cm}^2 = \text{Rs. } 330$$

7. The boundary wall of a masjid is 100m long, 25cm wide and 2.5m high. Estimate the cost of cementing both sides of wall @ Rs. 200 per square metre.

Ans. Length of wall = 100m
 Width of wall = 25cm
 Height of wall = 2.5m
 Area of wall = $100 \times 2.5 = 250\text{m}$
 Area of both sides = $2 \times 250 = 500\text{m}$
 Cost of cementing per $\text{m}^2 = \text{Rs. } 200$
 Cost of cementing $500\text{m}^2 = 200 \times 500$
 $= \text{Rs. } 100000$

8. A prism made of glass is 3.5cm long. Its cross-section is an equilateral triangle having sides 2cm with cross-sectional area $\sqrt{3}\text{cm}^2$. Find total surface area of 3 such prisms.

Ans. Surface area = 2 base area + base perimeter × length
 Base area = $\sqrt{3}\text{cm}^2$
 Perimeter = $2(2 + 2)$
 Length = 3.5cm
 Surface area = $2(\sqrt{3}) + 8 \times 3.5$
 $= 2(1.732) + 28.0$
 $= 3.464 + 28$
 $= 31.464\text{cm}^2$
 Area of 3 prism = $3(31.464)$
 $= 94.39\text{cm}^2$

9. A triangular prism shaped tent made of plastic sheet is 5m long. Dimensions of front face are 4m × 3m × 3m, having area 4.47m^2 . Find the amount (area) of plastic sheet used and its cost @ Rs. 100

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per m². Note that the side having length 4m is along the ground.

Ans. Base area = 4.47m^2

Area of tent = $(3 + 3) \times 5$

Total surface area = 2 base area
+ perimeter $\times$ length
= $2(4.47) + (3 + 3) \times 5$
= $8.94 + 6(5)$
= $8.94 + 30$
= 38.94m^2

Cost per m² = Rs. 100

Total cost = $100 \times 38.94 = \text{Rs. } 3894$

10. *What is the surface area of a prism having the base area 25m^2 , the base perimeter 24m and the length 12m ?*

Ans. Base area = 25m^2

Base perimeter = 24m

Length = 12m

Surface area = 2 base area
+ base perimeter $\times$ length
= $2(25) + 24(12)$
= $50 + 288 = 338\text{m}^2$

Exercise 11.4

1. *Convert*

(i) *6cm^3 to mm^3*

Ans. $1\text{cm} = 10\text{mm}$

$1\text{cm}^3 = 10 \times 10 \times 10\text{mm}^3$

$6\text{cm}^3 = 6 \times 10 \times 10 \times 10\text{mm}^3$
= 6000mm^3

(ii) *120cm^3 to m^3*

Ans. $1\text{cm} = 0.01\text{m}$

$1\text{cm}^3 = 0.01 \times 0.01 \times 0.01\text{m}^3$

$120\text{cm}^3 = 120 \times 0.01 \times 0.01 \times 0.01$

= 0.00012

(iii) *9m^3 to cm^3*

Ans. $1\text{m} = 100\text{cm}$

$1\text{m}^3 = 100 \times 100 \times 100\text{cm}^3$

$9\text{m}^3 = 9 \times 100 \times 100 \times 100$
= 9000000cm^3

(iv) *4000mm^3 to m^3*

Ans. $1\text{mm} = 0.001\text{m}$

$1\text{mm}^3 = 0.001 \times 0.001 \times 0.001\text{m}^3$

$4000\text{mm}^3 = 4000 \times 0.001 \times 0.001 \times 0.001$

$4000\text{mm}^3 = 0.000004\text{m}^3$

(v) *2000cm^3 to m^3*

Ans. $1\text{cm} = 0.01\text{m}$

$1\text{cm}^3 = 0.01 \times 0.01 \times 0.01\text{m}^3$

$2000\text{cm}^3 = 2000 \times 0.01 \times 0.01 \times 0.01$

$2000\text{cm}^3 = 0.002\text{m}^3$

(vi) *20m^3 to litres*

Ans. $1\text{m} = 100\text{cm}$

$1\text{m}^3 = 100 \times 100 \times 100\text{cm}^3$

$20\text{m}^3 = 20 \times 100 \times 100 \times 100\text{cm}^3$

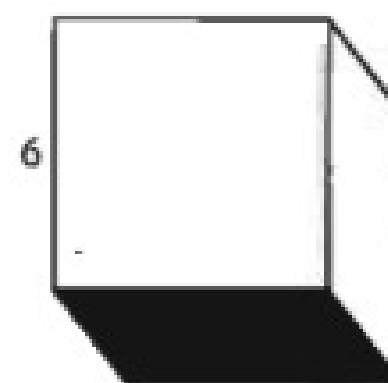
$20\text{m}^3 = 20000000\text{cm}^3$

$1000\text{cm}^3 = 1 \text{ litre}$

$20000000\text{cm}^3 = 20000 \text{ litres}$

2. *Find the volume of the following prisms (all measurements are in cms.):*

(i)



Ans. Base area = 36cm^2

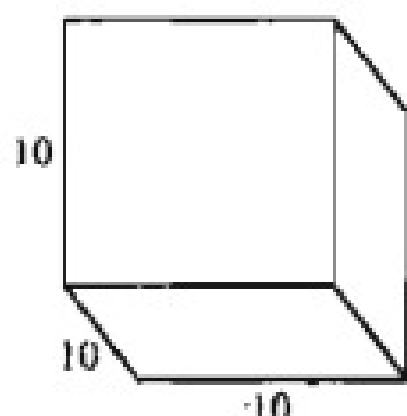
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$$\text{Length} = 6\text{cm}$$

$$\text{Volume} = A \times h$$

$$= 36 \times 6 = 216\text{cm}^3$$

(ii)



Ans. Length = 10cm

$$w = 10\text{cm}$$

$$h = 10\text{cm}$$

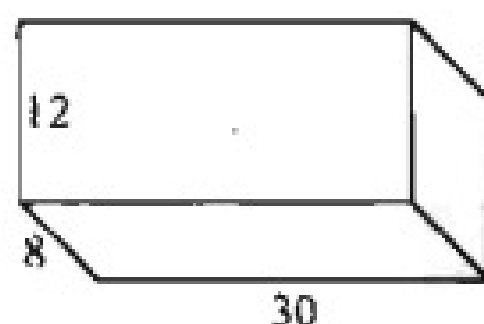
$$\text{Volume} = A \times h$$

$$= (l \times w) \times h$$

$$= (10 \times 10) 10$$

$$= 100 \times 10 = 1000\text{cm}^3$$

(iii)



Ans. Length = 30cm

$$w = 8\text{cm}$$

$$h = 12\text{cm}$$

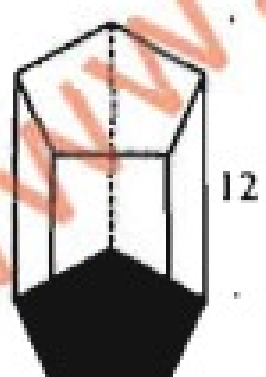
$$\text{Volume} = A \times h$$

$$= (l \times w) \times h$$

$$= (30 \times 8) 12$$

$$= 240 \times 12 = 2880\text{cm}^3$$

(iv)



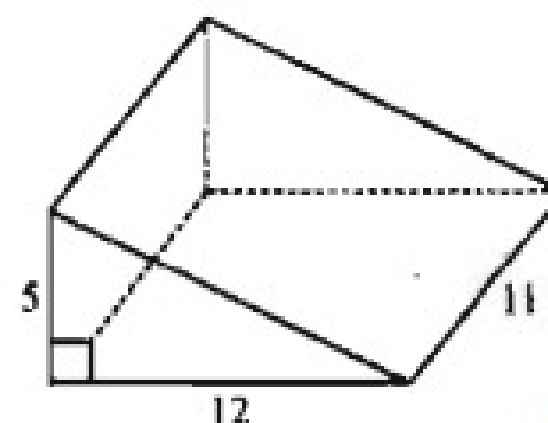
Ans. Area = 50cm^2

$$\text{height} = 12\text{cm}$$

$$\text{Volume} = A \times h$$

$$= 50 \times 12 = 600\text{cm}^3$$

(v)



Ans. Length = 12cm

$$w = 11\text{cm}$$

$$h = 5\text{cm}$$

$$\text{Volume} = A \times h$$

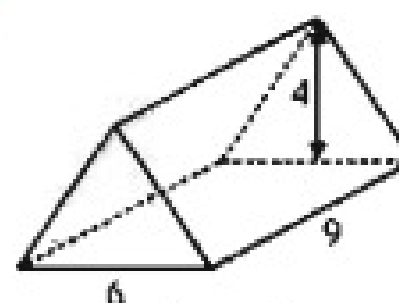
$$= (l \times w) \times h$$

$$= \frac{1}{2} (12 \times 11) \times 5$$

$$= \frac{1}{2} \times 132 \times 5$$

$$= 66 \times 5 = 330\text{cm}^3$$

(vi)



Ans. Length = 9cm

$$w = 6\text{cm}$$

$$h = 4\text{cm}$$

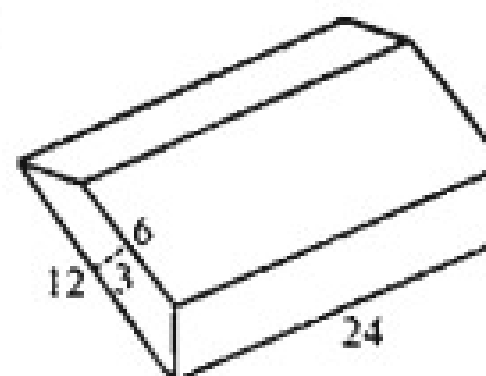
$$\text{Volume} = A \times h$$

$$= (l \times w) \times h$$

$$= \frac{1}{2} (9 \times 6) \times 4$$

$$= \frac{1}{2} \times 54 \times 4 = 108\text{cm}^2$$

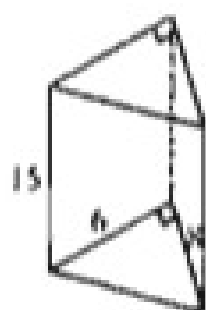
(vii)



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Ans. $a = 12\text{cm}$, $b = 6\text{cm}$, $c = 3\text{cm}$,
 $h = 24\text{cm}$
 Volume = $A \times h$
 Volume = $\left(\frac{a+b}{2}\right) \times c \times h$
 $= \left(\frac{12+6}{2}\right) \times 3 \times 24$
 $= \frac{18}{2} \times 3 \times 24$
 $= 9 \times 3 \times 24 = 648\text{cm}^3$

(viii)



Ans. $a = 6\text{cm}$, $b = 8\text{cm}$, $c = 15\text{cm}$
 Volume = $A \times h$
 Volume = $\frac{1}{2} (6 \times 8) \times 15$
 $= \frac{1}{2} \times 48 \times 15$
 $= 24 \times 15 = 360\text{cm}^3$

3. Find the volume of a small tank of cuboid shape with the dimensions 50cm, 40cm and 30cm. How many litres of water can the tank hold? ($1000\text{ cm}^3 = 1\text{ litre}$)

Ans. $l = 50\text{m}$, $w = 40\text{cm}$, $h = 30\text{cm}$
 Volume = $l \times w \times h$
 $= 50 \times 40 \times 30 = 60000\text{cm}^3$
 $= 60\text{ litre}$

4. The volume of a rectangular prism is 1920cm^3 . If the base measures 12cm by 16cm, find the height of the prism.

Ans. $l = 16\text{cm}$, $w = 12\text{cm}$, $h = ?$
 Volume of prism = 1920cm^3

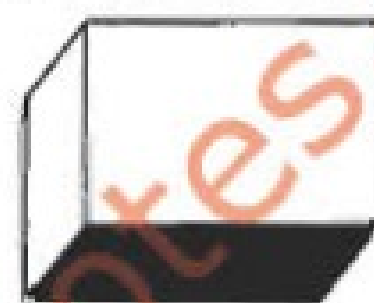
$$l \times w \times h = 1920\text{cm}^3$$

$$16 \times 12 \times h = 1920\text{cm}^3$$

$$h = \frac{1920}{16 \times 12}$$

$$h = \frac{1920}{192} = 10\text{cm}$$

5. Anwar bought an aquarium for fish. If he wants to pour 10 litres of water in the aquarium, how many litres of excess water will remain?



Ans. $A = 800\text{cm}^2$, $h = 10\text{cm}$
 Value of aquarium = $A \times h$
 $= 800 \times 10$
 $= 8000\text{cm}^3$
 Volume in liters = $\frac{8000}{1000}$
 $(1000\text{cm}^3 = 1\text{ liter})$
 $= 8\text{ liters}$

Excess water = $10 - 8 = 2\text{ liters}$

6. Surface area of a cube is 150m^2 . Find: (i) the length of its side, (ii) its volume.

Ans. Surface area of cube = 150cm^2
 In cube = $a = b = c = 2(ab + bc + ca)$
 $= 2(a \times a + a \times a + a \times a)$
 $= 2(a^2 + a^2 + a^2)$
 $= 6a^2 = 150$
 $a^2 = \frac{150}{6}$
 $a^2 = 25$
 $\sqrt{a^2} = \sqrt{25}$
 $a = 5\text{cm}$

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length = 5cm

Volume = $l \times l \times l$

$$= 5 \times 5 \times 5 = 125\text{cm}^3$$

7. How many litres of milk can a square container of side 20cm and height 15cm hold?

Ans. Square container = $l = w = 20\text{cm}$

Height $h = 15\text{cm}$

Volume = $l \times w \times h$

$$= 20 \times 20 \times 15$$

$$= 400 \times 15 = 6000\text{cm}^3$$

Milk hold = $\frac{6000}{1000} = 6$ liters ($1000\text{cm}^3 = 1\text{liter}$)

8. How many 3-centimetre cubes can be cut out of a 12-centimetre cube shaped prism, if there is no wastage in cutting?

Ans. Volume of cube shaped prism

$$= l \times l \times l$$

$$= 12 \times 12 \times 12 = 1728\text{cm}^3$$

Value of cubes = $l \times l \times l$

$$= 3 \times 3 \times 3 = 27\text{cm}^3$$

$$\text{No. of cube cut out} = \frac{1728}{27} = 64$$

9. A glass prism is 6cm long. Length and height of its cross-section are 4cm and 3cm respectively.

(i) Find its volume.

(ii) Find the price of prism @ Rs. 2 per cm^3 .

Ans. Length of prism = 6cm

Length of cross-section = 4cm

Height = 3cm

Volume = $l \times l \times l$

$$= 6 \times 4 \times 3 = 72\text{cm}^3$$

Price of prism @ $2/\text{cm}^3 = 72 \times 2 = \text{Rs. } 144$

10. The base area and the length of a triangular prism are 50cm^2 and 10cm respectively. What is the weight of the prism @ 0.5 gram per cm^3 ?

Ans. Base area = 50cm^2

Height = 10cm

Volume = $A \times h$

$$= 50 \times 10 = 500\text{cm}^3$$

Weight of prism @ $0.5 \text{ gram}/\text{cm}^3$

$$= 500 \times 0.5 = 2500 = 250 \text{ gram}$$

11. A triangular prism shaped tent is 9m long and 3m high. The base of door has length of 2m.

(i) Find the volume of tent.

(ii) How many people can live in it, if each person needs 3m^3 space?

Ans. Base of tent = 2m

Length of tent = 9m

Height of tent = 3m

$$\text{Volume} = \frac{1}{2} (2 \times 9 \times 3)$$

$$= \frac{1}{2} \times 54 = 27\text{m}^3$$

Space need by one person = 3m^3

$$\text{No. of people in tent} = \frac{27}{3} = 9 \text{ peoples}$$

Exercise 11.5

1. Complete the following table where radius and height of a cylinder are given.

S.No.	Radius (r)	Height (h)	Area of curved surface = $2\pi rh$	Area of circular surface = $2\pi r^2$	Total surface area = $2\pi rh + 2\pi r^2$
(i)	21cm	50cm			
(ii)	4.2m	10m			
(iii)	1.4m	2m			
(iv)	3.5cm	10cm			

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Ans.

S.No	Radius (r)	Height (h)	Area of curved surface = $2\pi rh$	Area of circular surface = $2\pi r^2$	Total surface area = $2\pi rh + 2\pi r^2$
(i)	21cm	50cm	$2 \times \frac{22}{7} \times 21 \times 50$ = 6600cm ²	$2 \times \frac{22}{7} \times (21)^2$ = 2772cm ²	6600 + 2772 = 9372cm ²
(ii)	4.2m	10m	$2 \times \frac{22}{7} \times 4.2 \times 10$ = 264m ²	$2 \times \frac{22}{7} \times (4.2)^2$ = 110.88m ²	264 + 110.88 = 374.88m ²
(iii)	1.4m	2m	$2 \times \frac{22}{7} \times 1.4 \times 2$ = 17.6m ²	$2 \times \frac{22}{7} \times (1.4)^2$ = 12.32m ²	17.6 + 12.32 = 29.92m ²
(iv)	3.5cm	10cm	$2 \times \frac{22}{7} \times 3.5 \times 10$ = 220cm ²	$2 \times \frac{22}{7} \times (3.5)^2$ = 77cm ²	220 + 77 = 297cm ²

2. Find the area of the curved surface of a cylinder having a radius 14cm and length 36cm. Express the area in meters also.

Ans. Radius $r = 14\text{cm}$
Length $l = 36\text{cm}$
Area of curved surface = $2\pi rl$
 $= 2 \times \frac{22}{7} \times 14^2 \times 36$
 $= 3168\text{cm}^2 = \frac{3168}{100} = 31.68\text{m}^2$

3. Area of the curved surface of a pillar having a cylindrical shape is 6.6m^2 . Find the height of pillar if its radius is 0.21m.

Ans. Area of curved surface = 6.6m^2
 $2\pi rl = 6.6\text{m}^2$
 $2 \times \frac{22}{7} \times 0.21 \times l = 6.6\text{m}^2$
 $l = \frac{6.6 \times 7}{2 \times 22 \times 0.21}$
 $l = \frac{46.2}{9.24}$
 $l = 5\text{m}$

4. A gas pipe is 14m long. Find the cost of nickel plating on the outer surface of the pipe at the rate of Rs. 50 per square metre if its diameter is 0.4m.

Ans. Length of pipe = 14m

Diameter = 0.4

Radius of pipe = $\frac{0.4}{2} \text{ m} = 0.2\text{m}$

Area of outer surface = $2\pi rl$

$$= 2 \times \frac{22}{7} \times 0.2 \times 14$$

= Rs. 880

5. Internal radius of a concrete cylindrical shaped water tank open from top is 2.5m. Its depth is 4m. Find the cost of cementing its walls from the inside and the base at the rate of Rs. 60 per square meter.

Ans. Radius of water tank = 2.5m
Height of water tank = 4m
Area of base = $\pi r^2 = \frac{22}{7} (2.5)^2$
 $= \frac{22}{7} \times 6.25$
 $= \frac{137.5}{7}$
 $= 19.64\text{m}^2$

Area of walls = $2\pi rl$

$$= 2 \times \frac{22}{7} \times 2.5 \times 4 = 62.85\text{m}^2$$

Total area = $19.64 + 62.85 = 82.49$

Cost per meter square = Rs. 60

Cost of 82.49 = $60 \times 82.49 = \text{Rs. } 4950$

6. An open cylindrical bottle has a base area equal to 154cm^2 . Its length is 30cm. Find its total surface area.

Ans. Base area = 154cm^2
 $\pi r^2 = 154$
 $\frac{22}{7} (r)^2 = 154$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

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

$$r^2 = 7 \times 7$$

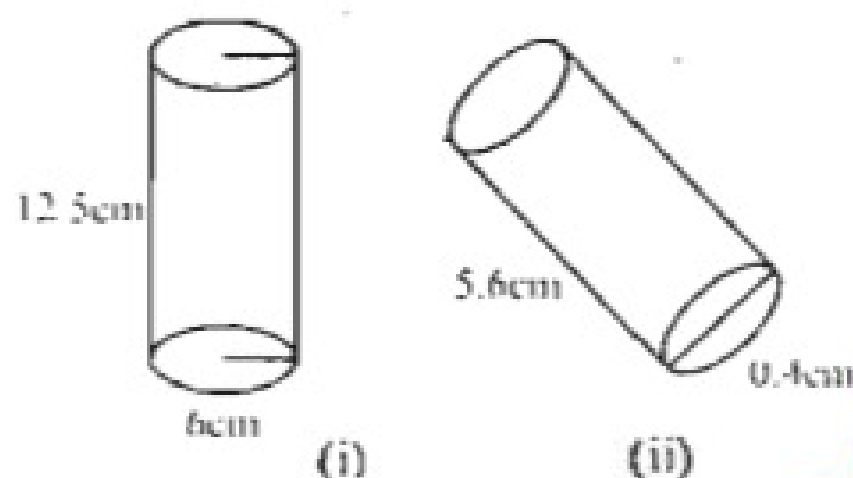
$$\sqrt{r^2} = \sqrt{7^2}$$

$$r = 7\text{cm}$$

$$\begin{aligned}\text{Area of bottle} &= 2\pi r l \\ &= 2 \times \frac{22}{7} \times 7 \times 30 \\ &= 44 \times 30 \\ &= 1320\text{m}^2\end{aligned}$$

$$\text{Total area} = 154 + 1320 = 1474\text{m}^2$$

7. Find the total surface area of the adjoining cylinders.



Ans

$$\begin{aligned}\text{(i) Radius} &= 6\text{cm} \\ \text{height} &= 12.5\text{cm} \\ \text{Area of curved surface} &= 2\pi r h \\ &= 2 \times \frac{22}{7} \times 6 \times 12.5 \\ &= \frac{3300}{7} = 471.428 \\ \text{Area of circular surface} &= 2\pi r^2 \\ &= 2 \times \frac{22}{7} \times (6)^2 \\ &= 2 \times \frac{22}{7} \times 36 \\ &= \frac{1584}{7} = 226.285 \\ \text{Total surface area} &= 471.428 + 226.335 \\ &= 697.7\text{cm}^2\end{aligned}$$

$$\text{(ii) Diameter} = 0.4\text{cm}$$

$$\text{Radius} = \frac{0.4}{2} = 0.2\text{cm}$$

$$\text{Height} = 5.6\text{cm}$$

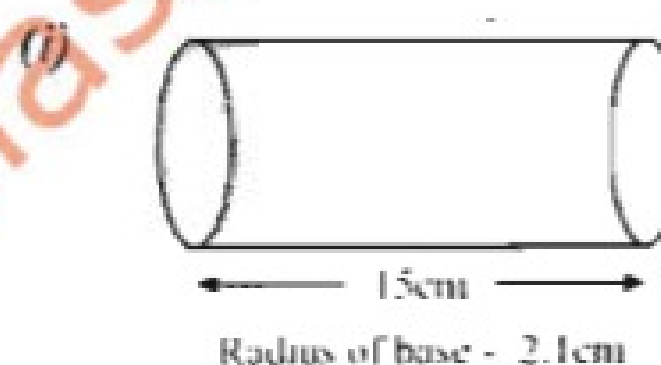
$$\begin{aligned}\text{Area of curved surface} &= 2\pi r h \\ &= 2 \times \frac{22}{7} \times (0.2 \times 5.6) = 7.04\text{cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of circular surface} &= 2\pi r^2 \\ &= 2 \times \frac{22}{7} \times (0.2)^2 \\ &= \frac{44}{7} \times 0.04 = 0.25\text{cm}^2\end{aligned}$$

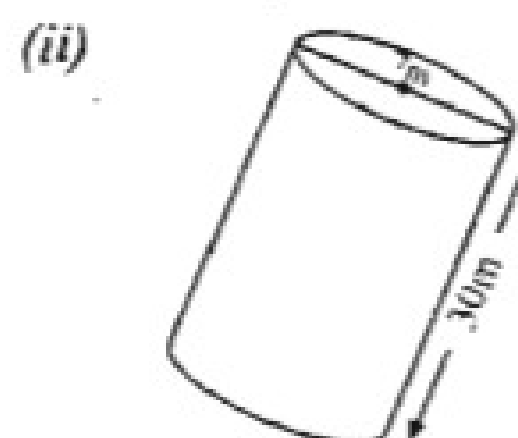
$$\text{Total surface area} = 7.04 + 0.25 = 7.29\text{cm}^2$$

Exercise 11.6

1. Find the volume of the following cylinders.



$$\begin{aligned}\text{Ans. Radius of base} &= 2.1\text{cm} \\ \text{Length} &= 15\text{cm} \\ \text{Volume of cylinder} &= \pi r^2 h \\ &= \frac{22}{7} \times (2.1)^2 \times 15 \\ &= \frac{22}{7} \times 4.41 \times 15 \\ &= \frac{1455.3}{7} = 207.9\text{cm}^3\end{aligned}$$



MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Ans. Diameter = 7m

$$\text{Radius} = \frac{7}{2} = 3.5\text{m}$$

$$\text{Length} = 30\text{m}$$

$$\text{Volume of cylinder} = \pi r^2 l$$

$$= \frac{22}{7} \times (3.5)^2 \times 30$$

$$= \frac{22}{7} \times 12.25 \times 30$$

$$= \frac{8085}{7} = 1155\text{m}^2$$

2. Complete the following table regarding cylinder.

S.No.	Radius (r)	Diameter (d)	Height (h)	Volume (V)
(i)	5cm		10cm	
(ii)		8cm	12cm	
(iii)	4cm			704m ³

Ans.

S.No.	Radius (r)	Diameter (d)	Height (h)	Volume (V)
(i)	5cm	10cm	10cm	$\pi r^2 h = \frac{22}{7} \times (5)^2 \times 10 = 785.71\text{cm}^3$
(ii)	4cm	8cm	12cm	$\pi r^2 h = \frac{22}{7} \times (4)^2 \times 12 = 601.428\text{cm}^3$
(iii)	4cm	8cm	14cm	$\pi r^2 h = 704\text{cm}^3$ $h = \frac{704}{\pi r^2}$

3. The radius and height of a wooden cylinder are 7cm and 12cm respectively. Find the volume of cylinder.

Ans. Volume of cylinder = $\pi r^2 h$

$$= \frac{22}{7} (7)^2 \times 12$$

$$= \frac{22}{7} \times 49 \times 12$$

$$= 22 \times 7 \times 12$$

$$= 1848\text{cm}^3$$

4. The height of a cylindrical shaped tin of milk powder is 14cm. Find its volume if the diameter of the tin is 10.5cm.

Ans. Diameter = 10.5cm

$$\text{Radius} = \frac{10.5}{2} = 5.25\text{cm}$$

$$\text{Volume of cylindrical tin} = \pi r^2 h$$

$$= \frac{22}{7} (5.25)^2 \times 14$$

$$= \frac{22}{7} \times 27.56 \times 14 = 1212.75\text{cm}^3$$

5. The area of the base of a cylinder is 250.5cm². Find the volume of the cylinder in litres, if its height is 20cm.

Ans. Base area = 250.5cm²

$$\pi r^2 = 250.5$$

$$\frac{22}{7} \times r^2 = 250.5$$

$$r^2 = \frac{250.5 \times 7}{22} = 79.70$$

$$\sqrt{r^2} = \sqrt{79.70}$$

$$r = 8.92 \text{ or } 9$$

$$\text{Volume} = \pi r^2 h$$

$$= \frac{22}{7} (9)^2 \times 20 = 5091.42$$

$$\text{Volume in liter} = \frac{5091}{1000} = 5.09 \text{ liter}$$

$$(1000 \text{ cm}^3 = 1 \text{ liter})$$

6. The height of a cylinder is 3.5cm. Its volume is 539cm³.

(i) Find the radius of the cylinder.

(ii) Find the area of the curved surface of the cylinder.

Ans. (i) Volume = 539cm³

$$\pi r^2 h = 539$$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

$$\frac{22}{7} \times r^2 \times 3.5 = 539$$

$$r^2 = 539 \times \frac{7}{22 \times 3.5}$$

$$r^2 = 49$$

$$\sqrt{r^2} = \sqrt{49}$$

$$r = 7\text{cm}$$

(ii) Area of curved surface = $2\pi rh$

$$= 2 \times \frac{22}{7} \times 7 \times 3.5$$

$$= 154\text{cm}^2$$

7. The height of a gas cylinder is 8m.

(i) Find the volume of the cylinder if radius of the base is 2.1m.

(ii) Find the cost of gas inside it @ Rs. 100 per meter cube.

Ans. Height = 8cm, Radius = 2.1m

$$\text{Volume of cylinder} = \pi r^2 h$$

$$= \frac{22}{7} \times (2.1)^2 \times 8$$

$$= \frac{22}{7} \times 4.41 \times 8$$

$$= \frac{776.16}{7} = 110.88\text{m}^3$$

$$\text{Rate of per m}^3 = \text{Rs. } 100$$

$$\text{Cost of } 110.88\text{m}^3 = 100 \times 110.88 = \text{Rs. } 11088$$

8.(i) How much soil is required to fill a 16m deep well with a radius 3.5m?

(ii) How many trucks of soil are required to fill the well if each truck contains 77m^3 of soil?

Ans. Depth of well = $h = 16\text{m}$

$$\text{Radius of well} = r = 3.5\text{m}$$

$$\text{Volume of well} = \pi r^2 h$$

$$= \frac{22}{7} \times (3.5)^2 \times 16$$

$$= \frac{22}{7} \times 12.25 \times 16$$

$$= \frac{4312}{7} = 616\text{m}^3$$

$$\text{Truck contains soil} = 77\text{m}^3$$

$$\text{No. of trucks required} = \frac{616\text{m}^3}{77\text{m}^3} = 8 \text{ trucks}$$

9. Two cylinders have the same diameter i.e. 35cm. Their heights are 8cm and 12cm respectively. Find the ratio of their volumes.

Ans. Radius of 1st cylinder = 3.5cm

Radius of sec cylinder = 3.5cm

$$r_1 = 3.5\text{cm}$$

$$r_2 = 3.5\text{cm}$$

$$h_1 = 8\text{cm}$$

$$h_2 = 12\text{cm}$$

$$v_1 = \pi r_1^2 h_1$$

$$v_2 = \pi r_2^2 h$$

$$= \frac{22}{7} (3.5)^2 \times 8 = \frac{22}{7} (3.5) \times 12$$

$$8 : 12$$

$$2 : 3$$

10. A lead pencil is in the shape of cylinder. The pencil is 14cm long with radius 0.4cm and its lead is of radius 0.01cm. What is the volume of wood in the pencil?

Ans. Radius of pencil = 0.4cm

Length of pencil = 14cm

$$\text{Value of pencil} = \pi r^2 l$$

$$= \frac{22}{7} \times (0.4)^2 \times 14^2$$

$$= 22 \times 0.16 \times 2$$

$$= 7.04\text{cm}^3$$

Radius of lead = 0.1cm

Length of lead = 14cm

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

$$\begin{aligned}\text{Volume of lead} &= \pi r^2 l \\ &= \frac{22}{7} \times (0.1)^2 \times 14^2 \\ &= 22 \times 0.01 \times 2 \\ &= 0.44\end{aligned}$$

$$\text{Volume of wood} = 7.04 - 0.44 = 6.6\text{cm}^3$$

Review Exercise 11

1. Choose the correct option in the following:

(i) Which one is the ratio between circumference and diameter of circle?

- ✓(a) π (b) r
(c) h (d) A

(ii) Circumference of a circle having a radius 7cm is:

- (a) 44cm^2 (b) 22cm^2
✓(c) 44cm (d) 22cm

(iii) A wheel has a circumference of 22cm. What is its diameter?

- (a) 21cm (b) 14cm
(c) 3.5cm ✓(d) 7cm

(iv) What is the area of a circular region having a radius of 7cm?

- (a) 616cm^2 (b) 660cm^2
(c) 161cm^2 ✓(d) 154cm^2

(v) Area of a circular region is 154m^2 . What is its radius?

- (a) 49m ✓(b) 7m
(c) 154m (d) 14m

(vi) Area of a circular region is 120cm^2 . What is the area of a quarter circle?

- (a) 60cm^2 (b) 20cm^2
✓(c) 30cm^2 (d) 80cm^2

(vii) Area of a circular surface of oil tin is:

- (a) $2\pi r^2$ (b) $2\pi r^2 h$
✓(c) $2\pi rh$ (d) $2r^2$

(viii) Ra of a cylinder is 7cm. Its height is 6cm. What is the area of its curved surface?

- ✓(a) 254cm^2 (b) 154cm^2
(c) 264cm^2 (d) 245cm^2

(ix) 1 litre = _____

- (a) 1cm^3 (b) 10dm^3
✓(c) 1dm^3 (d) 10cm^3

(x) If the radius of a circle is 1dm, then the area of the circle is:

- (a) $2\pi\text{dm}^2$ ✓(b) πdm^2
(c) 31.4dm^2 (d) 62.8dm^2

(xi) Radius of a cylinder is 2cm and the height is 7cm. Its volume is:

- ✓(a) 88cm^3 (b) 88cm^2
(c) 8.8m^3 (d) 0.88cm^3

(xii) Surface area of a triangular prism in which, $a = b = c$, is:

- (a) $2al + 3ah$ (b) $3al + 2ah$
(c) $al + 2ah$ ✓(d) $3al + ah$

(xiii) Base area and perimeter of a prism are 20cm^2 and 25cm respectively. Its length is 8cm. What is the surface area of this prism?

- ✓(a) 240cm^2 (b) 250cm^2
(c) 200cm^2 (d) 225cm^2

(xiv) Area of a base of a prism is 50cm^2 . What is the volume of prism if its height is 4cm?

- (a) 300cm^3 ✓(b) 200cm^3

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

(c) 100cm^3 (d) 50cm^3

2. A circular table cover has a radius of 70cm. Find the cost of doing pico the table cover at the rate of Rs. 20 per metre.

Ans. Radius of cover = 70cm

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

$$= 2 \times \frac{22}{7} (70)$$

$$= 2 \times \frac{22}{7} \times 70^{10}$$

$$= 440\text{cm} = 4.40\text{m}$$

$$\text{Cost of pico @ Rs. 20 perimeter} = 4.40 \times 20 \\ = \text{Rs. 88}$$

3. A piece of wire of length 6.28cm is bent to form a circle. Find the area enclosed by circle so formed.

$$(\pi \approx 3.14)$$

Ans. Circumference of circle = 6.28cm

$$2\pi r = 6.28$$

$$2 \left(\frac{22}{7} \right) r = 6.28$$

$$r = 6.28 \times \frac{7}{2 \times 22} = 0.999$$

or 1cm

$$\text{Area} = \pi r^2 = 3.14 (1)^2 = 3.14\text{cm}^2$$

4. Height of a drum is 1.6m. Find the total surface area of the drum if the diameter of its base is 1.68m.

Ans. Diameter = 1.68m

$$\text{Radius } r = \frac{1.68}{2} = .84\text{m}$$

$$\text{Height } h = 1.6\text{m}$$

Area of curved surface of drum

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

$$= 2 \times \frac{22}{7} \times .84 (0.84 + 1.6)$$

$$= 44 \times .12 (2.44) = 12.88\text{cm}^2$$

5. A hollow pipe open from both ends is 25m long. Radius of its base is 7cm. Find the mass of the pipe at the rate of 10kg per square metre.

Ans. Length of pipe = 25m or 2500cm

$$\text{Radius} = 7\text{cm}$$

$$\text{Area} = 2\pi r l$$

$$= 2 \times \frac{22}{7} \times 7^1 \times 2500$$

$$= 110000\text{cm}^2 = 11\text{m}^2$$

$$\text{Mass of pipe } 10\text{kg/m}^2 = 10 \times 11 = 110\text{kg}$$

6. Radius of the base of a cylinder is 2.1m. Find the height of the cylinder if its volume is 693m^3 .

Ans. Volume of cylinder = 693m^3

Area of base $\times$ height

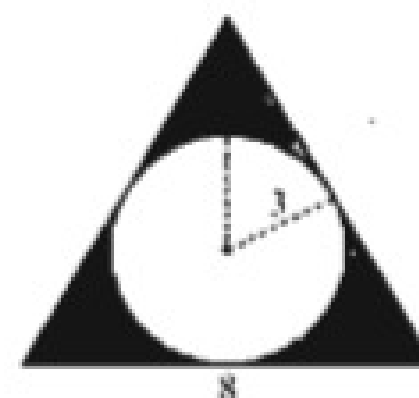
$$\pi r^2 h = 693$$

$$\frac{22}{7} \times (2.1)^2 \times h = 693$$

$$\frac{22}{7} \times 4.41 \times h = 693$$

$$h = 693 \times \frac{7}{22 \times 4.41} = \frac{4851}{97.02} = 50\text{m}$$

7. Find the area of a shaded region in the following figure. All quantities are measured in centimetres.



MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Ans. Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times 8 \times 7$$

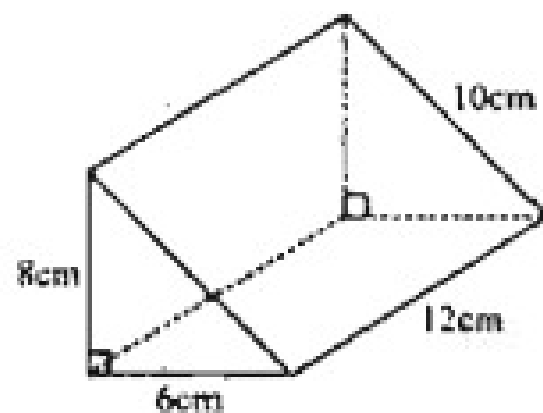
$$= 28\text{cm}^2$$

Area of circle = πr^2

$$= \frac{22}{7} \times (3)^2$$

$$= \frac{22}{7} \times 9 = 28.28\text{cm}^2$$

8. A rectangular block is formed by sticking two identical triangular prisms. One such prism is shown in the figure:



- What is the surface area of this triangular prism?
- What is the volume of this triangular prism?
- What is the volume of the rectangular block obtained by sticking two triangular prisms together?

Ans.

- Surface area of a prism = $2 \times \text{base area} + \text{base perimeter} \times \text{height}$

$$= 2 \times \text{base area} + \text{base perimeter} \times \text{height}$$

$$= 2 \times \frac{1}{2} \times 8 \times 6 + 2(12 + 6) \times 8$$

$$= 48 + 36 \times 8 = 48 + 288 = 336\text{cm}^2$$

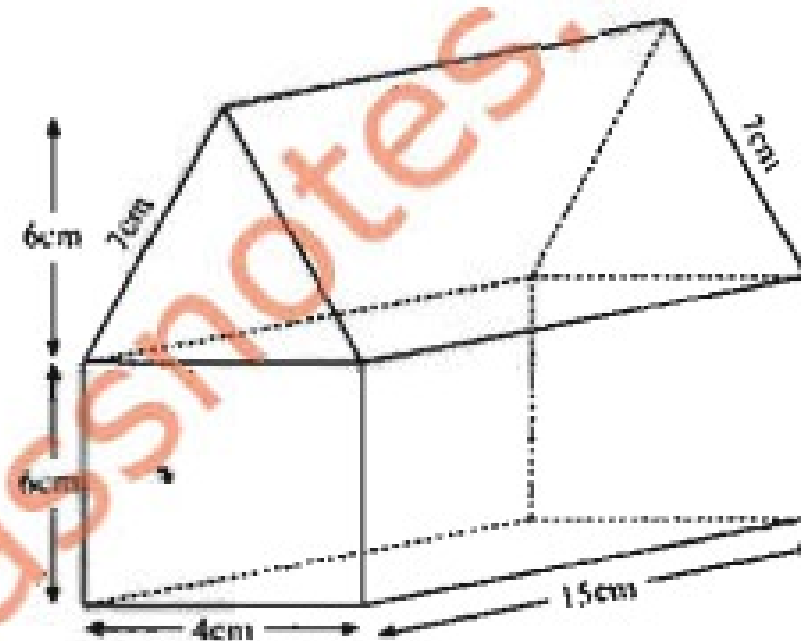
- Volume of prism = Area of cross-section $\times$ distance between parallel ends

$$= \frac{1}{2} \times b \times h = \frac{1}{2} (6 \times 12) \times 8$$

$$= \frac{1}{2} \times 72 \times 8 = 288\text{cm}^3$$

- Volume of two prisms = $2 \times 288 = 576\text{cm}^3$

9. A toy house is made by sticking a triangular prism on top of a rectangular prism, as shown in the figure.



- What is the volume of the rectangular prism?
- What is the volume of the triangular prism?
- What is the volume of the house?
- What is the surface area of the house?

Ans.

- Volume of rectangular prism

$$= \text{base} \times \text{height}$$

$$= (4 \times 15) \times 6$$

$$= 60 \times 6 = 360\text{cm}^3$$

- Volume of triangular prism

$$= \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times (15 \times 4) \times 6$$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

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$$= \frac{1}{2} \times 60 \times 6 = 180\text{cm}^3$$

(iii) Volume of house = Volume of rectangular + volume of triangular

$$= 360 + 180 = 540\text{cm}^3$$

(iv) Surface area = $2 \times$ base area + base perimeter $\times$ height of rectangular prism

$$= 2 \times 15 \times 4 + 38 \times 6$$

$$= 120 + 228 = 348\text{cm}^2$$

Surface arc of = $2 \times$ base arc

+ base perimeter $\times$ height

Triangular prism

$$= 2 \times \frac{1}{2} \times 15 \times 4 + \frac{1}{2} \times b \times h$$

$$= 60 + \frac{1}{2} \times 38 \times 6$$

$$= 60 + 114 = 174\text{cm}^2$$

$$\text{Total surface area} = 348 + 174 = 522\text{cm}^2$$