

Unit 12

**CIRCUMFERENCE,
AREA & VOLUME**

EXERCISE NO. 12.1

1. Find the circumference of the circle when its diameter is:

(i) $d = 28\text{cm}$:

Solution:

$$d = 28$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi \times d$$

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

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

$$c = \frac{616}{7} = 88$$

Ans: $c = 88\text{cm}$

(ii) $d = 35\text{cm}$:

Solution:

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

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi \times d$$

$$c = \frac{22}{7} \times 35$$

$$c = \frac{22 \times 35}{7}$$

$$c = \frac{770}{7} = 110$$

Ans: $c = 110\text{cm}$

(iii) $d = 42\text{mm}$:

Solution:

$$d = 42\text{mm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi \times d$$

$$c = \frac{22}{7} \times 42$$

$$c = \frac{22 \times 42}{7}$$

$$c = \frac{924}{7} = 132$$

Ans: $c = 132\text{mm}$

(iv) $d = 56\text{mm}$:

Solution:

$$d = 56\text{mm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi \times d$$

$$c = \frac{22}{7} \times 56$$

$$c = \frac{22 \times 56}{7}$$

$$c = \frac{1232}{7} = 176$$

Ans: $c = 176\text{mm}$

B. Find the circumference of the circle when its radius is:

(i) 10.5cm:

Solution:

$$r = 10.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2\pi r$$

$$c = 2 \times \frac{22}{7} \times 10.5$$

$$c = \frac{462}{7} = 66$$

Ans: $c = 66\text{cm}$

(ii) 28cm:

Solution:

$$r = 28\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2\pi r$$

$$c = 2 \times \frac{22}{7} \times 28$$

$$c = \frac{1232}{7} = 176$$

Ans: $c = 176\text{cm}$

(iii) 38.5cm:

Solution:

$$r = 38.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2\pi r$$

$$c = 2 \times \frac{22}{7} \times 38.5$$

$$c = \frac{1694}{7} = 242$$

Ans: $c = 242\text{cm}$

(iv) 49cm:

Solution:

$$r = 49\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2\pi r$$

$$c = 2 \times \frac{22}{7} \times 49$$

$$c = \frac{2156}{7} = 308$$

Ans: $c = 308\text{cm}$

(v) 59.5cm:

Solution:

$$r = 59.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2 \times \frac{22}{7} \times 59.5$$

$$c = \frac{2618}{7} = 374$$

Ans: $c = 374\text{cm}$

(vi) 63cm:

Solution:

$$r = 63\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2 \times \frac{22}{7} \times 63$$

$$c = \frac{2772}{7} = 396$$

Ans: $c = 396\text{cm}$

(vii) 80.5cm:

Solution:

$$r = 80.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2 \times \frac{22}{7} \times 80.5$$

$$c = \frac{\cancel{3542}}{7} 506$$

Ans: $c = 506\text{cm}$

(viii) 77cm:

Solution:

$$r = 77\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2 \times \frac{22}{7} \times 77$$

$$c = \frac{\cancel{3388}}{7} 484$$

Ans: $c = 484\text{cm}$

C. Find the radius of the circle when its circumference.

(i) 22cm:

Solution:

$$c = 22\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{22}{\frac{22}{7}}$$

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

$$d = 7$$

$$r = \frac{d}{2}$$

$$r = \frac{7}{2} = 3.5$$

Ans: $r = 3.5\text{cm}$

(ii) 66cm:

Solution:

$$c = 66\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{66}{\frac{22}{7}}$$

$$d = \frac{66 \times 7}{22}$$

$$d = 21$$

$$r = \frac{d}{2}$$

$$r = \frac{21}{2} = 10.5$$

Ans: $r = 10.5\text{cm}$

(iii) 88cm:

Solution:

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

$$d = 28$$

$$r = \frac{d}{2}$$

$$r = \frac{28}{2} = 14$$

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

Ans: r = 14cm

(iv) 110cm:

Solution:

$$d = \frac{110}{2}$$

$$d = \frac{110 \times 7}{22}$$

$$d = \frac{770}{22} = 35$$

$$r = \frac{d}{2} = \frac{35}{2} = 17.5$$

Ans: r = 17.5cm

(v) 132cm:

Solution:

$$d = \frac{132 \times 7}{22}$$

$$d = 42$$

$$r = \frac{d}{2}$$

$$r = \frac{42}{2} = 21$$

Ans: r = 21cm

(vi) 176cm:

Solution:

$$d = \frac{176 \times 7}{22}$$

$$d = 56$$

$$r = \frac{d}{2}$$

$$r = \frac{56}{2} = 28$$

Ans: r = 28cm

(vii) 220cm:

Solution:

$$d = \frac{220}{2}$$

$$d = \frac{220 \times 7}{22}$$

$$d = 70$$

$$r = \frac{d}{2}$$

$$r = \frac{70}{2} = 35$$

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

Ans: r = 35cm

(viii) 198cm:

Solution:

$$d = \frac{198 \times 7}{22}$$

$$d = 63$$

$$r = \frac{d}{2}$$

$$r = \frac{63}{2} = 31.5$$

$$r = 31.5$$

Ans: r = 31.5cm

D. Find the diameter of the circle, when its circumference is:

(i) 44cm:

Solution:

$$c = 44\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{44}{\frac{22}{7}}$$

$$d = \frac{44 \times 7}{22}$$

$$d = \frac{308}{22} = 14$$

Ans: $d = 14\text{cm}$

(ii) 154cm:

Solution:

$$c = 154\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{154}{\frac{22}{7}}$$

$$d = \frac{154 \times 7}{22}$$

$$d = \frac{1078}{22}$$

Ans: $d = 49\text{cm}$

(iii) 242mm:

Solution:

$$c = 242\text{mm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{242}{\frac{22}{7}}$$

$$d = \frac{242 \times 7}{22}$$

$$d = \frac{1694}{22}$$

Ans: $d = 77\text{mm}$

(iv) 262mm:

Solution:

$$c = 264\text{mm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{264}{\frac{22}{7}}$$

$$d = \frac{264 \times 7}{22}$$

$$d = \frac{1848}{22}$$

Ans: $d = 84\text{cm}$

(v) 132cm:

Solution:

$$c = 132\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{132 \times 7}{22}$$

$$d = \frac{924}{22}$$

$$\text{Ans: } d = 42\text{cm}$$

(vi) 48.4cm:

Solution:

$$c = 48.4\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{48.4 \times 7}{22}$$

$$d = \frac{48.4 \times 7}{22}$$

$$\text{Ans: } d = 15.4\text{cm}$$

(vii) 30.8cm:

Solution:

$$c = 30.8\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{30.8 \times 7}{22}$$

$$d = \frac{30.8 \times 7}{22}$$

$$d = 9.8$$

$$\text{Ans: } d = 9.8\text{cm}$$

(viii) 52.8cm:

Solution:

$$c = 52.8\text{cm}$$

$$\pi = \frac{22}{7}$$

$$d = ?$$

$$d = \frac{c}{\pi}$$

$$d = \frac{52.8 \times 7}{22}$$

$$d = \frac{52.8 \times 7}{22}$$

$$d = 16.8$$

$$\text{Ans: } d = 16.8\text{cm}$$

E. Complete the table. Minute hand completes one round in 1 hour.

S. No.	Length of minute hand a clock is r	Find the distane covered by the minute hand
1.	$r = 1.4\text{cm}$	(i) Distance = $2\pi r$ $= \frac{2 \times 22 \times 1.4}{7} = 8.8\text{cm}$
2.	$r = 21\text{mm}$	
3.	$r = 35\text{mm}$	
4.	$r = 2.8\text{cm}$	
5.	$r = 42\text{mm}$	
		
Note: minute hand completes one round in 1 hours)		

Ans:

S. No.	Length of min hand a clock is r	The distance covered by the minute hand	round in 1 hour
1	$r = 1.4\text{cm}$	$c = 2\pi r$ $c = \frac{2 \times 22 \times 1.4}{7} = 8.8$	8.8cm
2	$r = 21\text{mm}$	$c = 2\pi r$ $c = \frac{2 \times 22 \times 21}{7} = 132$	132mm
3	$r = 35\text{mm}$	$c = 2\pi r$ $c = \frac{2 \times 22 \times 35}{7} = 220$	220mm
4	$r = 42\text{mm}$	$c = 2\pi r$ $c = \frac{2 \times 22 \times 8}{7} = 417.6$	417.6cm
5	$r = 42\text{mm}$	$c = 2\pi r$ $c = \frac{2 \times 22 \times 42}{7} = 264$	264mm

F. Find the minimum length of the string required to measure the circular boundary in each of the following:



Solution:

$$d = 21\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi d$$

$$c = \frac{21 \times 22}{7}$$

Ans: $c = 66\text{cm}$



Solution:

$$d = 56\text{cm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi d$$

$$c = \frac{56 \times 22}{7}$$

Ans: $c = 176\text{cm}$

(iii)



Solution:

$$d = 1.4\text{mm}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \pi d$$

$$c = \frac{1.4 \times 22}{7}$$

Ans: $c = 4.4\text{mm}$

A. Find the area of circular region when its radius is:

(i) 14cm:

Solution:

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

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

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

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

$$A = 616$$

Ans: $A = 616 \text{ Sq cm}$

(ii) 10.5cm:

Solution:

$$r = 10.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (10)^2$$

$$A = \frac{22 \times 10.5 \times 10.5}{7}$$

$$A = 346.55$$

Ans: $A = 346.55 \text{ Sq cm}$

(iii) 21cm:

Solution:

$$r = 21\text{cm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (21)^2$$

$$A = \frac{22 \times 21 \times 21}{7}$$

$$A = 22 \times 63$$

$$A = 1386$$

Ans: $A = 1386 \text{ Sq cm}$

(iv) 17.5cm:

Solution:

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

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (17.5)^2$$

$$A = \frac{22 \times 17.5 \times 17.5}{7}$$

$$A = \frac{6737.5}{7}$$

Ans: $A = 962.5 \text{ Sq cm}$

Solution:

$$r = 35\text{mm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (35)^2$$

$$A = \frac{22 \times 35 \times 35}{7}$$

$$A = 3,850$$

Ans: $A = 3,850 \text{ Sq cm}$

Solution:

$$r = 24.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (24.5)^2$$

$$A = \frac{22 \times 24.5 \times 24.5}{7}$$

$$A = 1,886.5$$

Ans: $A = 1,886.5 \text{ Sq cm}$

(vii) 71.4cm:

Solution:

$$r = 71.4\text{cm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (71.4)^2$$

$$A = \frac{22 \times 71.4 \times 71.4}{7}$$

$$A = 16,022.16$$

Ans: $A = 16,022.16 \text{ Sq cm}$

(viii) 38.5cm:

Solution:

$$r = 38.5\text{cm}$$

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

$$A = \frac{22}{7} \times (38.5)^2$$

$$A = \frac{22 \times 38.5 \times 38.5}{7}$$

$$A = 124.74$$

Ans: $A = 124.74 \text{ Sq cm}$

B. Find the radius of the circular region when its area is:

(i) 154 Sq. mm:

Solution:

$$A = 154 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

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

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

$$r^2 = \frac{1078}{22} = 49$$

$$r^2 = 49$$

Ans: $r = 7\text{mm}$

(iii) 7546 Sq. mm:

Solution:

$$A = 7546 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = 7546 \div \frac{22}{7}$$

$$r^2 = \frac{7546 \times 7}{22}$$

$$r^2 = \frac{52822}{22}$$

$$r^2 = 2401$$

Ans: $r = 49\text{mm}$

(ii) 2,464 Sq. cm:

Solution:

$$A = 2,464 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = 2464 \div \frac{22}{7}$$

$$r^2 = \frac{2464 \times 7}{22}$$

$$r^2 = \frac{17248}{22} = 784$$

$$r^2 = 784$$

Ans: $r = 28\text{cm}$

(iv) 5,544 Sq. cm:

Solution:

$$A = 5,544 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = \frac{22}{7} \div 5544$$

$$r^2 = \frac{5544 \times 7}{22}$$

$$r^2 = \frac{38808}{22}$$

$$r^2 = 1764$$

Ans: $r = 42\text{mm}$

(v) 6.16 Sq. cm:

Solution:

$$A = 6.16 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = 6.16 \div \frac{22}{7}$$

$$r^2 = \frac{6.16 \times 7}{22}$$

$$r^2 = \frac{43.12}{22}$$

$$r^2 = 1.96$$

Ans: $r = 1.4\text{mm}$

(vi) 38.5 Sq.mm:

Solution:

$$A = 38.5 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = \frac{38.5}{\frac{22}{7}}$$

$$r^2 = \frac{38.5 \times 7}{22}$$

$$r^2 = \frac{38.5 \times 7}{22}$$

$$r^2 = \frac{269.5}{22}$$

$$r^2 = 12.25$$

Ans: $r = 3.5\text{mm}$

(vi) 962.5 Sq. cm:

Solution:

$$A = 962.5 \text{ Sq. cm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{\pi}{A}$$

$$r^2 = 962.5 \div \frac{22}{7}$$

$$r^2 = \frac{962.5 \times 7}{22}$$

$$r^2 = \frac{6737.5}{22}$$

$$r^2 = 306.25$$

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

(vii) 75.46 Sq.mm:

Solution:

$$A = 75.46 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{A}{\pi}$$

$$r^2 = \frac{75.46}{\frac{22}{7}}$$

$$r^2 = 75.46 \div \frac{22}{7}$$

$$r^2 = \frac{75.46 \times 7}{22}$$

$$r^2 = \frac{528.22}{22}$$

$$r^2 = 24.01$$

Ans: $r = 4.9\text{mm}$

(ix) 13.86 Sq.mm:

Solution:

$$A = 13.86 \text{ Sq. mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{A}{\pi}$$

$$r^2 = \frac{13.86}{\frac{22}{7}}$$

$$r^2 = \frac{13.86 \times 7}{22}$$

$$r^2 = \frac{97.02}{22}$$

$$r^2 = 4.41$$

$$\text{Ans: } r = 2.1 \text{ mm}$$

D. Find the diameter of the circular region when its area is as under:

(i) 154 cm²:

Solution:

$$A = 154$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2 = r^2 = \frac{A}{\pi}$$

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

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

$$r^2 = \frac{1078}{22}$$

$$r^2 = 49$$

$$r = 7$$

$$D = 2r$$

$$D = 2 \times 7$$

$$\text{Ans: } D = 14 \text{ cm}$$

(ii) 1,386 (mm)²:

Solution:

$$A = 1386$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = \frac{1386}{\frac{22}{7}}$$

$$r^2 = \frac{1386 \times 7}{22}$$

$$r^2 = \frac{9702}{22}$$

$$r^2 = 441$$

$$r = 21$$

$$D = 2r$$

$$D = 2 \times 21$$

$$\text{Ans: } D = 42 \text{ cm}$$

(iii) 3,850 (mm)²:

Solution:

$$A = 3,850 \text{ mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 3850 \div \frac{22}{7}$$

$$r^2 = \frac{3850 \times 7}{22}$$

$$r^2 = \frac{26950}{22}$$

$$r^2 = 1225$$

$$r = 35$$

$$D = 2r$$

$$D = 2 \times 35$$

$$\text{Ans: } D = 70 \text{ mm}$$

(iv) 9,856 (mm)²:

Solution:

$$A = 9,856 \text{ mm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 9856 \div \frac{22}{7}$$

$$r^2 = \frac{9856 \times 7}{22}$$

$$r^2 = \frac{68992}{22}$$

$$r^2 = 3136$$

$$r = 56$$

$$D = 2r$$

$$D = 2 \times 56$$

$$\text{Ans: } D = 112 \text{ mm}$$

(v) 124.74 cm²:

Solution:

$$A = 124.74 \text{ cm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 124.74 \div \frac{22}{7}$$

$$r^2 = \frac{124.74 \times 7}{22}$$

$$r^2 = \frac{873.18}{22}$$

$$r^2 = 39.69$$

$$r = 6.3$$

$$D = 2r$$

$$D = 2 \times 6.3$$

$$\text{Ans: } D = 12.6 \text{ cm}$$

(vi) 186.34 cm²:

Solution:

$$A = 186.34 \text{ cm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 186.34 \div \frac{22}{7}$$

$$r^2 = \frac{186.34 \times 7}{22}$$

$$r^2 = \frac{1304.38}{22}$$

$$r^2 = 59.29$$

$$r = 7.7$$

$$D = 2r$$

$$D = 2 \times 7.7$$

$$\text{Ans: } D = 15.4 \text{ cm}$$

(vii) 221.76 cm²:

Solution:

$$A = 221.76 \text{ cm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 221.76 \div \frac{22}{7}$$

$$r^2 = \frac{221.76 \times 7}{22}$$

$$r^2 = \frac{1552.32}{22}$$

$$r^2 = 70.56$$

$$r = 8.4$$

$$D = 2r$$

$$D = 2 \times 8.4$$

$$\text{Ans: } D = 16.8 \text{ cm}$$

(viii) 260.26 cm:

Solution:

$$A = 260.26 \text{ cm}$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$r^2 = 260.26 \div \frac{22}{7}$$

$$r^2 = \frac{260.26 \times 7}{22}$$

$$r^2 = \frac{1821.82}{22}$$

$$r^2 = 82.81$$

$$r = 9.1$$

$$D = 2r$$

$$D = 2 \times 9.1$$

$$\text{Ans: } D = 18.2 \text{ cm}$$

EXERCISE 12.3

A. Find the total surface of the cylindrical region when the radius of the base of cylinder and height of the cylinder are given.

(i) Radius = 14cm, Height = 26cm:

Solution:

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

$$h = 26 \text{ cm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 14(14 + 26)$$

$$A = \frac{2 \times 22 \times 14^2}{7} \times (40)$$

$$A = 88 + 40 = 3520$$

$$\text{Ans: } A = 3520 \text{ Sq. cm}$$

Solution:

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

$$h = 18 \text{ cm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 10(10 + 18)$$

$$A = \frac{2 \times 22 \times 10}{7} (28)$$

$$A = 62.85 \times 28 = 1760$$

$$\text{Ans: } A = 1760 \text{ Sq. cm}$$

(iii) Radius = 21cm, Height = 29mm:

Solution:

$$r = 21\text{mm}$$

$$h = 29\text{mm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 21 (29 + 21)$$

$$A = \frac{44 \times 21}{7} (50)$$

$$A = 132 \times 50 = 6600$$

$$\text{Ans: } A = 6600 \text{ Sq. cm}$$

(iv) Radius = 17.5cm, Height = 22cm:

Solution:

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

$$h = 22\text{cm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 17.5 (17.5 + 22)$$

$$A = \frac{44 \times 17.5}{7} (17.5 + 22.5)$$

$$A = \frac{770}{7} \times (40)$$

$$A = 110 \times 40 = 4400$$

$$\text{Ans: } A = 4400 \text{ Sq. cm}$$

(v) Radius = 30cm, Height = 40cm:

Solution:

$$r = 30\text{cm}$$

$$h = 40\text{cm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 30 (30 + 40)$$

$$A = \frac{44 \times 30}{7} (70)$$

$$A = \frac{1320}{7} \times 70$$

$$A = 188.5 \times 70 = 1320$$

$$\text{Ans: } A = 1320 \text{ Sq. cm}$$

(vi) Radius = 2.5cm, Height = 41.5cm:

Solution:

$$r = 2.5\text{cm}$$

$$h = 41.5\text{cm}$$

$$A = ?$$

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

$$A = 2 \times \frac{22}{7} \times 2.5 (2.5 + 41.5)$$

$$A = \frac{44 \times 2.5}{7} (66.5)$$

$$A = \frac{1100}{7} \times 66.5$$

$$A = 157.14 \times 66.5$$

$$\text{Ans: } A = 10450 \text{ Sq. cm}$$

B. Find the height of the cylindrical region when its radius and total surface area are given:

(i) Radius = 10.5, T, S
are = 9800cm²:

Solution:

$$r = 10.5\text{cm}$$

$$A = 980 \text{ Sq. cm}$$

$$h = ?$$

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

$$980 = 2 \times \frac{22}{7} \times 10.5 (10.5 + h)$$

$$980 = \frac{2 \times 22 \times 10.5}{7} (10.5 + h)$$

$$980 = 66(10.5 + h)$$

$$980 = 693 + 66h$$

$$287 = 66h$$

$$h = \frac{287}{66} = 19.5\text{cm}$$

$$\text{Ans: } h = 19.5\text{cm}$$

(iii) Radius = 12mm Total
surface area = 2122cm²:

Solution:

$$r = 12\text{mm}$$

$$A = 2,112 \text{ Sq. mm}$$

$$h = ?$$

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

$$2112 = 2 \times \frac{22}{7} \times 12 (12 + h)$$

$$2112 = \frac{528}{7} (12 + h)$$

$$2112 = 905.5 + 75.4h$$

$$2112 - 905.5 = 75.4h$$

$$h = \frac{1206.4}{75.4} = 44\text{mm}$$

$$\text{Ans: } h = 44\text{cm}$$

(ii) Radius = 17.5cm Total
surface area = 4400cm²:

Solution:

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

$$A = 4,400 \text{ cm}^2$$

$$h = ?$$

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

$$4,400 = 2 \times \frac{22}{7} \times 17.5 (17.5 + h)$$

$$4400 = \frac{2 \times 22 \times 17.5}{7} (17.5 + h)$$

$$4400 = 110 (17.5 + h)$$

$$4400 = 1925 + 110h$$

$$2475 = 110h$$

$$h = \frac{2475}{110} = 22.5\text{cm}$$

$$\text{Ans: } h = 22.5\text{cm}$$

(iv) Radius = 15cm Total
surface area = 3960cm²:

Solution:

$$r = 15\text{cm}$$

$$A = 3960$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

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

$$3960 = 2 \times \frac{22}{7} \times 15 (15 + h)$$

$$3960 = 1414.28 + 94.28h$$

$$h = 3960 - 1414.28 = 94.28$$

$$h = \frac{2545.72}{94.28} = 27\text{cm}$$

$$\text{Ans: } h = 227\text{cm}$$

(iv) Radius = 28cm Total
surface area = 10560cm²;

Solution:

$$r = 25\text{cm}$$

$$A = 10,560$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

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

$$10560 = 2 \times \frac{22}{7} \times 25(12 + h)$$

$$10560 = 157.14(25 + h)$$

$$10560 = 3928.57 + 157.14h$$

$$10560 - 3928.57 = 157.14h$$

$$h = \frac{6631.43}{157.14} = 32\text{cm}$$

$$\text{Ans: } h = 32\text{cm}$$

EXERCISE 12.4

A. In each of the following. The radius of the base of cylinder and its height in given. What is the volume in each case?

(i) Radius = 14cm, height = 20cm:

Solution:

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

$$h = 20\text{cm}$$

$$v = ?$$

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

$$v = \frac{22}{7} (14)^2 20$$

$$v = \frac{22}{7} \times 14 \times 14 \times 20$$

$$v = 44 \times 280$$

$$\text{Ans: } v = 12,320 \text{ cm}^3$$

(ii) Radius = 25cm, height = 35cm:

Solution:

$$r = 25\text{cm}$$

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

$$v = ?$$

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

$$v = \frac{22}{7} (25)^2 35$$

$$v = \frac{22}{7} \times 25 \times 25 \times 35$$

$$v = \frac{22}{7} \times 625 \times 35$$

$$\text{Ans: } v = 68750 \text{ cm}^3$$

(iii) Radius = 28cm, height = 40cm:

Solution:

$$r = 28\text{cm}$$

$$h = 40\text{cm}$$

$$v = ?$$

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

$$v = \frac{22}{7} (28)^2 40$$

$$v = \frac{22}{7} \times 28 \times 28 \times 40$$

$$v = 88 \times 28 \times 40$$

Ans: $v = 98560 \text{ cm}^2$

(iv) Radius = 20cm, height = 28cm:

Solution:

$$r = 20\text{cm}$$

$$h = 28\text{cm}$$

$$v = ?$$

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

$$v = \frac{22}{7} (20)^2 28$$

$$v = \frac{22}{7} \times 20 \times 20 \times 28$$

$$v = 22 \times 20 \times 20 \times 4$$

$$v = 22 \times 1600$$

Ans: $v = 35200 \text{ cm}^2$

(v) Radius = 1.05m, height = 2.5m:

Solution:

$$r = 1.05\text{m}$$

$$h = 2.5\text{m}$$

$$v = ?$$

$$v = \frac{22}{7} (1.05)^2 2.5$$

$$v = \frac{22 \times 1.025 \times 2.5}{7}$$

$$v = \frac{22 \times 2.7562}{7}$$

$$v = \frac{60.6375}{7}$$

Ans: $v = 8.6625 \text{ m}^2$

(vi) Radius = 63.5cm, height = 75cm:

Solution:

$$r = 63.5\text{cm}$$

$$h = 75\text{cm}$$

$$v = ?$$

$$v = \frac{22}{7} (63.5)^2 75$$

$$v = \frac{22 \times 63.5 \times 63.5 \times 2.5}{7}$$

$$v = \frac{22 \times 4032.25 \times 2.5}{7}$$

$$v = \frac{6653212.5}{7}$$

Ans: $v = 956455.5 \text{ cm}^2$

(vii) Radius = 70mm,
height = 50mm:

Solution:

$$r = 70\text{mm}$$

$$h = 50\text{mm}$$

$$v = ?$$

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

$$v = \frac{22}{7} (70)^2 50$$

$$v = \frac{22 \times 70 \times 70 \times 50}{7}$$

$$v = 210 \times 3500$$

Ans: $v = 192,500\text{mm}^2$

(viii) Diameter = 60mm,
height = 63mm:

Solution:

$$r = 60\text{mm}$$

$$h = 63\text{mm}$$

$$v = ?$$

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

$$v = \frac{22}{7} (60)^2 63$$

$$v = \frac{22 \times 60 \times 60 \times 63}{7}$$

$$v = \frac{4989600}{7}$$

Ans: $v = 178200\text{mm}^2$

B. In each of the following, the radius of the base of the cylinder and its volume is given. What is the height of cylinder in each.

(i) Radius = 14cm,
Volume = 15,400:

Solution:

$$v = 15,400\text{m}^2$$

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

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 15400}{22 \times 14 \times 14^2}$$

$$h = \frac{15400}{616}$$

Ans: $h = 25\text{cm}$

(ii) Radius = 20cm,
Volume = 35200
cubic millimeters:

Solution:

$$r = 20\text{mm}$$

$$v = 35200$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 35200}{22 \times 20 \times 20}$$

$$h = \frac{246400}{8800}$$

Ans: $h = 28\text{cm}$

**(iii) Radius = 25cm,
Volume = 82500
cubic millimeters:**

Solution:

$$r = 25\text{mm}$$

$$v = 82500$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 82500}{22 \times 25 \times 25}$$

$$h = \frac{577500}{13750}$$

$$\text{Ans: } h = 42\text{cm}$$

**(iv) Radius = 21.5cm,
Volume = 305,085
cubic millimeters:**

Solution:

$$r = 21.5\text{mm}$$

$$v = 305,085\text{mm}^3$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 305085}{22 \times 21.5 \times 21.5}$$

$$h = \frac{2135595}{10169.5}$$

$$\text{Ans: } h = 210\text{mm}$$

**(v) Radius = 30mm,
Volume = 99000
cubic millimeters:**

Solution:

$$r = 30\text{mm}$$

$$v = 99,000$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 99000}{22 \times 30 \times 30}$$

$$h = \frac{693000}{19800}$$

$$\text{Ans: } h = 35\text{mm}$$

**(vi) Radius = 28cm,
Volume = 98560
cubic millimeters:**

Solution:

$$r = 28\text{cm}$$

$$v = 98560\text{cm}^3$$

$$\pi = \frac{22}{7}$$

$$h = ?$$

$$v = \pi \times r^2 \times h$$

$$h = \frac{7 \times 98560}{22 \times 28 \times 28}$$

$$h = \frac{98560}{2464}$$

$$\text{Ans: } h = 40\text{mm}$$

C. In each of the following, the height of the cylinder and its volume is given what is the radius of the base of the cylinder in each.

**(i) Height = 25cm,
Volume = 24650,
cubic cm.**

Solution:

$$v = 24650 \text{ cm}^3$$

$$h = 25\text{cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$24650 = \frac{22 \times 25}{7} = r^2$$

$$24650 = \frac{550}{7} = r^2$$

$$24650 = 78.57 \times r^2$$

$$r^2 = \frac{24650}{78.57} = 441$$

$$r^2 = 441$$

Ans: $r = 21\text{cm}$

**(ii) Height = 20mm,
Volume = 12320,
cubic cm.**

Solution:

$$v = 12320 \text{ cm}^3$$

$$h = 20\text{mm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$12320 = \frac{22 \times 20}{7} = r^2$$

$$12320 = \frac{440}{7} = r^2$$

$$12320 = 62.85 \times r^2$$

$$r^2 = \frac{12320}{62.85}$$

$$r^2 = 196$$

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

(iii) Height = 28mm,
Volume = 35200,
cubic cm.

Solution:

$$v = 35200 \text{ cm}^3$$

$$h = 28 \text{ cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$35200 = \frac{22 \times 28}{7} = r^2$$

$$35200 = \frac{22 \times 28}{7} = r^2$$

$$12320 = 88 \times r^2$$

$$r^2 = \frac{35200}{88} = 400$$

$$r^2 = 400$$

Ans: $r = 20 \text{ cm}$

(iv) Height = 42cm,
Volume = 118800,
cubic cm.

Solution:

$$v = 118800 \text{ cm}^3$$

$$h = 42 \text{ cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$118800 = \frac{22 \times 42}{7} = r^2$$

$$118800 = \frac{22 \times 42}{7} = r^2$$

$$12320 = 132 \times r^2$$

$$r^2 = \frac{118800}{132} = 900$$

$$r^2 = 900$$

Ans: $r = 30 \text{ cm}$

(v) Height = 56mm,
Volume = 281.600,
cubic mili meter.

Solution:

$$v = 281.600 \text{ cm}^3$$

$$h = 56 \text{ cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$281600 = \frac{22 \times 56}{7} = r^2$$

$$281600 = \frac{22 \times 56}{7} = r^2$$

$$281600 = 176 \times r^2$$

$$r^2 = \frac{281600}{176} = 1600$$

$$r^2 = 1600$$

Ans: $r = 40 \text{ cm}$

(vi) Height = 30cm,
Volume = 41,580,
cubic meter.

Solution:

$$v = 41,580 \text{ cm}^3$$

$$h = 30 \text{ cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

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

$$41580 = \frac{22 \times 30}{7} = r^2$$

$$41580 = \frac{660}{7} = r^2$$

$$41580 = 94.28 \times r^2$$

$$r^2 = \frac{41580}{94.28} = 441$$

$$r^2 = 441$$

Ans: $r = 21 \text{ cm}$

EXERCISE 12.5

1. The diameter of a circular garden is 70m. The garden has 5 round of wire fencing. If the wire cost Rs. 10 per meter find the cost of wire.

Solution:

$$d = 70 \text{ meter}$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = \frac{22}{7} \times 70$$

$$c = 220$$

$$\text{Round} \times \text{circular of garden} =$$

$$5 \times 220 = 1100$$

$$\text{rate length}$$

$$\text{The cost of wire Rs. 10 per}$$

$$\text{meter} = 10 \times 1100$$

$$= 11000$$

$$\text{Ans: Rs} = 1000$$

$$\text{The cost of wire}$$

2. Find the radius of a circular ring prepared from a wire used for a square with side 22cm.

Solution:

$$h = 22 \text{ cm}$$

$$r = ?$$

$$\pi = \frac{22}{7}$$

$$v = 22 \times 4 = 88$$

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

$$r^2 = \frac{880}{2}$$

$$r^2 = 196$$

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

3. The radius of a bicycle wheel is 42cm. Each wheel completed 1000 rotations when. Ahmed travelled from to school. Find the distance travelled in metres and kilometres travelled in metres.

Solution:

$$r = 42$$

$$\pi = \frac{22}{7}$$

$$c = ?$$

$$c = 2\pi r$$

$$c = 2 \times \frac{22}{7} \times 42$$

$$c = \frac{2 \times 22 \times 42}{7}$$

$$c = 44 \times 6 = 264$$

$$c = 264$$

$$c = 264 \text{ meter}$$

$$1000 \text{ meter} = 1 \text{ kilo meter}$$

$$1000 \times 264 = 264000$$

$$\text{Ans: } = 264 \text{ m or } 26400 \text{ km}$$

4. The total cost of wire required for four rounds of a circular fencing is Rs. 3,960/-. If the wire costs Rs. 5 per metre. Find the radius of the circular ground.

Solution:

$$A = 3960$$

$$\pi = \frac{22}{7}$$

$$r = ?$$

$$A = \pi r^2$$

$$3960 \div \frac{22}{7}$$

$$r^2 = \frac{3960 \times 7}{22}$$

$$r^2 = \frac{27720}{22} = 1260$$

$$r = 1260$$

$$\text{Four round of circular } 4 \times 5 = 20$$

$$r^2 = 2 \times 20 = 40$$

$$= \frac{1260}{40} = 31.5$$

Ans: = The radius of circular 31.5cm

5. A piece of wire is bent in the shape of an equilateral triangle having each side 13.2m it is again re-bent to form a circular ring. What is the diameter of the ring.

Solution:

$$\pi r^2 = D$$

$$13.2 \times \frac{22}{7} = r^2$$

$$r^2 = \frac{13.2 \times 7}{22}$$

$$r^2 = \frac{71.4}{22}$$

$$r^2 = 3.24$$

Ans: $r = 1.8$

6. What is the area of a circular grade and the cost of gardening it at the rate of Rs. 20 per Sq. m when the radius of the circular garden is 14m.

Solution:

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

$$\pi = \frac{22}{7}$$

$$A = ?$$

$$A = \pi r^2$$

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

$$A = 616 \text{m}^2$$

$$20 \times 616 = 12320$$

$$\text{Ans:} = \text{Area : } 616 \text{m}^2, \text{ Cost Rs } 12320$$

7. There are two circular ground. The Outer circular ground has diameter 49m. The inner circular has diameter 35m. Find the area of the road and cost of cementing it at Rs. 100 per square meter.

Solution:

There are two circle.

(i) radius of outer circle = $R = 49\text{m}$

(ii) radius of inner circle = $R = 35\text{m}$

$$\text{Area of outer circle} = A = \pi r^2 \quad A = \frac{22 \times 49 \times 49}{7} = 7546$$

$$\text{Area of inner circle} = A = \pi r^2, A = \frac{22 \times 35 \times 35}{7} = 3850 \text{ m}^2$$

$\therefore$ Area of road = Area of outer circle - Area of inner circle

$$\text{Area of road} = 7546 - 3850 = 3696 \text{ m}^2$$

The cost of cementing the road is rate $\times$ area of the road = $100 \times 3696 = 369600$

$\therefore$ The cost of cementing the circular road is Rs = 369600.

Ans: Area = 3696 m^2 , Cost = Rs. 369,600

8. There is a round wooden table of 2.8m diameter. Find the area of the surface of the table and the cost of polishing it at the rate of Rs. 100 per Sq. meter.

Solution:

Diameter of table = 2.8 meter

$$\text{Radius of table} = \frac{2.8}{2} = 1.4$$

$$\text{Area of the surface of table} = A = \pi r^2$$

$$\text{Area of the surface of table} = A = \frac{22 \times 1.4 \times 1.4}{7} = 6.16$$

The cost of polishing of the table = Rate $\times$ length

$$\text{Rs} = 100 \times 6.16 = 616$$

Ans: Area = 6.16 m^2 , cost = Rs. 616

9. A circular fountain is built in the center of crossing. Its radius is 3.5m what is the area of fountain? Also find the cost of painting on it at the rate of painting on it at the rate of Rs. 75 per square metre.

Solution:

$$\text{Radius} = 3.5 \text{ metre}$$

$$\text{Area} = A = \pi r^2$$

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

$$A = 38.5 \text{m}^2$$

$$\text{The cost of painting on table} = \text{Rate} \times \text{length}$$

$$\text{The cost of painting on table} = 75 \times 38.5 = 2887.50$$

$$\text{Ans:} = \text{Area} = 38.5 \text{m}^2, \text{cost} = \text{Rs. } 2887.50$$

10. A table cover is made to cover a round dinning table. The diameter of the table cover is 3.5m. What is Area of the table cover? Also find the cost of the cloth at the rate of Rs. 80 per Sq. meter.

Solution:

$$\text{Diamter of table cover} = 3.5 \text{m}$$

$$\text{Radius of table cover} = \frac{3.5}{2} = 1.75 \text{m}$$

$$\text{Area of table cover} = A = \pi r^2$$

$$\text{Area of table cover} = A = \frac{22 \times 1.75 \times 1.75}{7} =$$

$$9.625$$

$$\text{Area} = 9.625\text{m}^2$$

$$\text{The cost of the cloth} = \text{Rate} \times \text{length}$$

$$\text{The cost of the cloth} = 80 \times 9.625 = 770$$

$$\text{Ans: Area} = 9.625\text{m}^2 = \text{cost} = \text{Rs. } 770$$

EXERCISE 12.6

1. The radius of an open pond in a cylindrical shape is 10.5m and depth is 8m. Find cost of cementing its floor and curved surface at the rate of Rs. 50 per sqr. mtr.

Solution:

$$\text{radius of pond} = 10.5\text{m}$$

$$\text{Area of pond} = A = \pi r^2$$

$$\text{Area of pond} = A = \frac{22 \times 10.5 \times 10.5}{7} = 346.5$$

$$\text{Area of pond} = 346.5$$

$$\text{Curved surface area of pond} = A = 2\pi rh$$

$$\text{Curved surface area} = A = \frac{2 \times 22 \times 10.5 \times 8}{7} = 528$$

$$\text{Total area of pond} = 346.5 + 528 = 874.5$$

$$\text{Cost of cementing} = \text{Rate} \times \text{area}$$

$$\text{Cost of cementing} = 50 \times 874.5 = 43725$$

$$\text{Ans: Area} = 874.5\text{m}^2 \text{ and cost} = \text{Rs. } 43,725$$

2. Find the Total cylinder tank has a base of diameter 2.8m. The radius of its circular base is 7m. Also find its cost at the rate of Rs. 100 per Sq. metre.

Solution:

The radius of tank = 7m

$$\text{The area of tank} = A = \pi r^2 = \frac{22 \times 7 \times 7}{7} = 154$$

$$\text{Curved surface area of tank} = A = 2\pi rh$$

$$A = \frac{2 \times 22 \times 7 \times 8.4}{7} = 523.6$$

$$\text{Total area of tank} = 523.6 + 154 = 677.6$$

$$\text{The cost of tank} = \text{Rate} \times \text{Area}$$

$$\text{The cost of tank} = 100 \times 677.6 = 67760$$

Ans: Area = 677.6 m² & cost Rs. = 67,760

3. An open cylindrical tank has a base of diameter 2.8m. The height of the tank is 5m. Find how many square metres of steel sheet are required for the tank. Also find the cost of the tank at the rate of Rs. 300 per square metre.

Solution:

Diameter of tank = 2.8m

$$\text{Radius of tank} = \frac{2.8}{2} = 1.4 \text{ m}$$

$$\text{Area of tank} = A = \pi r^2$$

$$\text{Area of tank} = A = \frac{22 \times 1.4 \times 1.4}{7} = 6.16$$

$$\text{Curved surface area of tank} = A = 2\pi rh$$

$$A = 44 \text{ m}^2$$

$$A = \frac{2 \times 22 \times 1.4 \times 5}{7} = 44$$

=====

Total area of steel sheet required to make the tank

$$6.16 + 44 = 50.16$$

The cost of tank = Rate $\times$ area

$$\text{The cost of tank} = 300 \times 50.16 = 15048$$

Ans: Area 50.16 & Cost Rs. = 15048

4. **The total cost of the wire required for four round of a circular fencing is Rs. 3,960/-. If the wire costs Rs. 5 per metre; Find the radius of the circular ground.**

Solution:

Radius of pipe = 7m

Length of pipe = 2.8m

Area of pipe = $2\pi rh$

$$\text{Area} = \frac{2 \times 22 \times 7 \times 2.8}{7} = 123.2$$

$$\text{Ans:} = \text{Area} = 1.232\text{m}^2$$

5. **Find the total surface area of oil drum whose length is 1.5m and diameter is 70cm.**

Solution:

Convert metres into the centimetres 1 meter =

1000cm

diameter = 70 cm

$$\text{radius} = \frac{70}{2} = 35\text{cm}$$

length 1.5m = 1500 cm

$$A = \frac{h}{d} = \frac{1500}{350} = 4.071$$

$$\text{Ans:} = \text{Area} = 4.07 \text{ m}^2$$

6. Find the capacity of a circular water tank in litres when the height of the tank is 5m and its diameter is 4.2m.

Solution:

1 liter = 1000 cm

1 meter = 1000 cm

diameter of tank = 4.2 meter

Radius of tank = $\frac{4.2}{2}$ metre

(2.1 × 1000 = 2100)

height of tank 5 meter (5 meter = 5000 cm)

Capacity = $\frac{2 \times 22 \times 2100}{7} (2100 \times 5000)$

= 69,300 liter

Volume 69,300 × 100 = 69300,000

Ans: Capacity (liter) 69,300, Volume 69,300,000 cm²

7. A cylindrical tin can is 63cm high and its radius is 25cm. Find how many litres of oil may be contained the tin can.

Solution:

Radius of tin = 25cm

height of tin = 63cm

Area (Capacity) tin = ? $A\pi r^2$

$A = \frac{22 \times 25 \times 25 \times 63}{7}$

A = 123.75

Volume = 123.75 × 1000 = 123750

Ans: Capacity = 123.75 liter, volume : 123750 cm²

8. A well is 16m deep and diameter is 7m. How much soil is required to fill it?

Solution:

Diameter of well = 7m

Radius of well = $\frac{7}{2}$ = 3.5

deep of well = 16m

Volume of well = ? $A = \pi r^2 h$

$$v = \frac{22 \times 3.5 \times 3.5 \times 16}{7} = 616$$

Ans: = volume = 616cm²

9. A tin pack of a soft drink is 10.5cm long and the radius of the tin pack is 3.5cm. Find the capacity of the tin in litre.

Solution:

Radius of tin pack = $r = 3.5$ m

length (height) of tin pack = $h = 10.5$ m

Capacity (volum) of tin pack = $v = ?$

$$v = \pi r^2 h = v \frac{22 \times 3.5 \times 3.5 \times 10.5}{7} = 404.25$$

$$v = 404.25$$

Change centimeter into liter = 1 liter = 1000 cm²

$$\therefore \frac{404.25}{1000} = 0.40425 \text{ or } 0.4$$

Ans: Volume = 404.2cm², capacity = 0.4 (approx)

10. The diameter of a circular well is 3.5m and its depth is 24m what will be the cost of digging it at the rate of Rs. 250 per cubic metre?

Solution:

Diameter of well = 3.5

radius of well = $\frac{3.5}{2} = 1.75$

depth of well = 24m

$v = ?$ $v = \pi r^2 h$

$$v = \frac{22 \times 1.75 \times 1.75 \times 24}{7} = 231$$

$$v = 231 \text{ m}^3$$

The cost of digging of well =

$$\text{Rate} \times \text{volume} = 250 \times 231 = 57750$$

Ans: Volume = 231 m³, Cost = Rs. 57,750

11. Find the radius of an oil drum whose volume is 22 m³.

Solution:

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

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

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

$$r^2 = \frac{7}{2} \times 1$$

$$r^2 = 1$$

$$r = 1$$

Ans: Radius = 1 metre

12. The capacity of an oil drum is 3850 liters what is its volume in cm^3 . Find the height in meters when its radius is 7cm.

Solution:

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

$$3850 = \frac{22}{7} (70)^2 h$$

$$h = \frac{7 \times 3850}{22 \times 70 \times 70}$$

$$h = \frac{107800}{2690} = 2.5$$

$$h = 2.5$$

$$\text{Capacity} = 3850$$

$$\text{Volume in liter} = 3850 \times 1000 = 3850000$$

$$\text{Ans: height} = 2.5 \text{ meter volume } 3,850,000 \text{ cm}^3$$

13. The internal diameter of a round cylindrical shape mosque is 28m and height of curved walls is 8.75m. Find the cost of tiles using on the walls only at the rate of Rs. 200 per m^2 .

Solution:

$$\text{Internal diameter of mosque} = 28\text{m}$$

$$\text{Internal radius of mosque} = \frac{28}{2} = 14$$

$$\text{height of wall of mosque} = 8.75\text{m}$$

$$\text{Curved surface area of mosque} = A = 2\pi rh$$

$$\text{Curved surface} = A = 2 \times \frac{22}{7} \times 14 \times 8.75 = 770$$

$$\text{Area} = 770 \text{ m}^2$$

$$\text{The cost likes} = \text{Area} \times \text{rate}$$

$$\text{The cost likes} = 770 \times 200 = 154000$$

$$\text{Ans: Area (curved walls)} = 770 \text{ m}^2, \text{ Cost} = \text{Rs. } 154000$$

14. The internal diameter of a swimming pool is 42m. The depth is 5m. Calculate the cost of tiles using round the wall at the rate of Rs. 100 per m^2 .

Solution:

Internal diameter of swimming pool = 42

Internal radius of swimming pool = $\frac{42}{2}$

Internal depth of swimming pool = 5m

Internal Area of swimming pool = $A = \pi r^2$

$$A = \frac{22 \times 21 \times 21 \times 5}{7 \times 7} = 1386$$

Curved surface Area = $A = 2 \pi r h$

$$A = \frac{2 \times 22 \times 21 \times 5}{7 \times 3} = 660$$

Total area of swimming pool = $1386 + 660 = 2046$

Total cost of tiles = rate $\times$ Area

$$100 \times 2046 = 204600$$

Ans: Area (base) = $1386m^2$

Area (Curved surface-walls) = $660m^2$

Total area = $2046m^2$

Cost Rs = 204,600

REVIEW EXERCISE 12

A. Answer the following:

1. What is circumference of a circle. Give formula to find circumference.

Ans: Circumference is the length of the boundary of a circle formula of to find the circumference =

$$c = 2\pi r$$

=====

2. What is relation between diameter and circumference?

Ans: Ratio between circumference and diameter of a circle is denoted by π i.e. $\frac{\text{circumference of the circle}}{\text{Diameter of the circle}}$
 $= \frac{22}{7} = 3.14$

3. What is diameter of a circle? Give relation between radius and diameter.

Ans: See page no. 218 of the textbook.

4. Give formula for finding area of a circle.

Ans: Formula $A = \pi r^2$

5. Write the formula for total surface area of a cylinder.

Ans: The volume of a cylinder is a circular face
volume of a cylinder = Area of the circular region $\times$ height of the cylinder
 $v = \pi r^2 \times h$
 $v = \pi r^2 h$ (cubic units)

7. What is the formula for finding diameter from circumference of a circle?

Ans: $C = 2\pi r$

8. In a cylinder when radius = height, what is the formula for finding volume of a cylinder?

Ans: $v = \pi r^2 h$

=====

B. Fill in the blanks:

1. The formula for finding curved surface area of the cylinder is $2\pi rh$.
2. Tin pack of soft drink is an example of cylinder.
3. Take ten coins of Rs. 5 and stake up a file then cylinder type of shape is obtained.
4. When radius of cylinder is in metres; the unit for volume of cylinder will be m^3 .
5. The value of π upto three decimal places is 3.142.

C. Solve the following mentally and chose the correct answer:

1. The circumference of a circle is _____ cm when its diameter is 7cm.

(a) $\frac{22}{7}$ (b) $\frac{7}{22}$ (c) 7 (d) 22

Ans: (a) $\frac{22}{7}$

2. The area of circle is _____ sq. cm when its radius is 1cm.

(a) $\frac{22}{7}$ (b) $\frac{7}{22}$ (c) $\frac{1}{7}$ (d) $\frac{1}{22}$

Ans: (a) $\frac{22}{7}$

3. The area of circular base of cylinder is _____ sq.cm when the value of $r^2 = \frac{1}{22}$ sq.cm.

(a) 7 (b) $\frac{1}{7}$ (c) 22 (iv) $\frac{1}{22}$

Ans: (b) $\frac{1}{7}$

4. Area of curved surface of a cylinder is ____ cm^2

when $r = 7 \text{ cm}$ and $h = \frac{1}{22} \text{ cm}$.

- (a) 1 (b) 2 (c) 3 (d) 4

Ans: (b) 2

5. Total surface area of a cylinder is ____ cm^2 when

$r = 1 \text{ cm}$ and $h = 1 \text{ cm}$.

- (a) 2π (b) 3π (c) 4π (d) π

Ans: (c) 4π

6. Volume of cylinder is ____ cm^3 when $r = 1 \text{ cm}$ and $h = 1 \text{ cm}$.

- (a) $\frac{22}{7}$ (b) $\frac{7}{22}$ (c) 22 (d) 7

Ans: (d) 7

7. Area of circular upper base and lower base of cylinder is ____ cm^2 when $r = 1 \text{ cm}$.

- (a) $\frac{22}{7}$ (b) $\frac{44}{7}$ (c) $\frac{7}{22}$ (d) $\frac{7}{44}$

Ans: (b) $\frac{44}{7}$

8. Height of an oil drum is 1 m and radius of the drum is also 1m. Then its volume is ____ m^3 .

- (a) 7 (b) 22 (c) $\frac{22}{7}$ (d) $\frac{7}{22}$

Ans: (c) $\frac{22}{7}$

9. The length of the minute hand of a clock is 3.5cm. The distance covered in 1 hour is ____ cm.

- (a) 22cm (b) 7cm (c) 3.5cm (d) 22.2cm

Ans: (c) 3.5cm

10. In a circle the radius is increased by twice in length. The area of the circle will be increased by ____.

- (a) Twice (b) Thrice
(c) Four times (d) None of these

Ans: (c) Four times

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