

			R	eview Ex	xercise 12		
1. Ch	oose the cor	rect option.					
(i) 1 m	3 =						
(a)	1 <i>l</i>	(b)	10 <i>l</i>	(c)	100 <i>l</i>	(d)	1000 <i>l</i>
(ii) Th	e curved sur	face area o	f cylinder is	5			
(a)	πr	(b)	$2\pi r$	(c)	πrh	(d)	$2\pi rh$
(iii) A	triangular p	rism has	surfa	ces.			
(a)	3	(b)	5	(c)	7	(d)	9
(iv) A	right circula	r cylinder -	ci	rcular flat	t bases.		
(a)	1	(b)	2	(c)	3	(d)	4
(v) If a	ı prism has p	entagonal	base, then r	number of	edges =		
(a)	5	(b)	10	(c)	15	(d)	20
First, c Base a We ha	Given that, v alculate base rea = Area of ve to calculat	volume = 17 area of the square = (L = (1) e the height	$.5 m^3$, Leng square based ength of sid $(5 m)^2$ $(5 m^2)$ of prism.	th of side of d prism. he) ² Pu	of base = 15 r	m AL louse	
	Height o	of prism = $-\frac{1}{2}$ = $0.$	$\frac{510 \text{ mm} \text{ corp}}{\text{Base Area}}$ $\frac{7.5 m^3}{25 m^2}$ $078 m$	1			
3. Fir (i)	nd volume an	nd surface a	rea of the f	collowing s	solids. $(\pi = \frac{1}{2})$	$\left(\frac{22}{7}\right)$	



Solution: As the given solid is cube. So we use:

Volume of cube =
$$(l)^3$$

= $(6.5 \ cm)^3$
= $6.5 \times 6.5 \times 6.5 \ cm^3$
= $274.63 \ cm^3$
Surface area of cube = $6 \times (l)^2$

Su

$$= 6 \times (6.5 \ cm)^2$$

= 6 × 42.25 cm²
= 253.5 cm²

(ii)



Solution: As the given solid is cylinder. So we use:

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

= $\frac{22}{7} \times (70 \, cm)^2 \times 160 \, cm$
= $\frac{22}{7} \times 4900^{700} \, cm^2 \times 160 \, cm$
= $22 \times 700 \, cm^2 \times 160 \, cm$
= $2464000 \, cm^3$

Surface area of cylinder = $2\pi r \times (r+h)$

$$= 2 \times \frac{22}{7} \times 70 \, cm \times (70 \, cm + 160 \, cm)$$
$$= 2 \times \frac{22}{7} \times 70^{10} \, cm \times (230 \, cm)$$
$$= 2 \times 22 \times 10 \, cm \times (230 \, cm)$$
$$= 440 \times 230 \, cm^{2}$$
$$= 101200 \, cm^{2}$$





Solution: As the given solid is cuboid. So we use:

Volume of cuboid = $l \times w \times h$

 $= 12 \ m \times 4 \ m \times 6.5 \ m$

 $= 312 m^3$

Surface area of cube = $2(l \times w) + 2(w \times h) + 2(l \times h)$

$$= 2(12 m \times 4 m) + 2(4 m \times 6.5 m) + 2(12 m \times 6.5 m)$$
$$= 2(48 m^{2}) + 2(26 m^{2}) + 2(78 m^{2})$$
$$= 96 m^{2} + 52 m^{2} + 156 m^{2}$$
$$= 304 m^{2}$$

4. Find the volume and surface area of a square based prism of height 6 *cm* and base of side length 4.5 *cm*. Find the cost of painting its vertical facts at the rate of Rs. 100 per *cm*.

Solution: As we know that

Volume of the prism = Base area \times Height of prism

Given that, height = 6
$$cm$$
, Length of side of base = 4.5 cm

First calculate base area of the square based prism.

Base area = Area of square = $(\text{Length of side})^2$

$$= (4.5 \ cm)^2$$

= 20.25 $\ cm^2$

Volume of the prism = Base area \times Height of prism

=
$$20.25 \ cm^2 \times 6 \ cm$$

= $121.5 \ cm^3$

Surface area of the prism = $2 \times$ Area of base of prism + Perimeter of base \times Height of prism

Perimeter of base = $4 \times \text{length of side}$

$$= 4 \times 4.5 \ cm$$

= 18 *cm*

Now use all values to calculate surface area of given square based prism.

Surface area of the prism = $2 \times 20.25 \ cm^2 + 18 \ cm \times 6 \ cm$

$$= 40.5 \ cm^2 + 108 \ cm^2$$
$$= 148.5 \ cm^2$$

To find the cost of painting its vertical facts at the rate of Rs.100 per cm

$$= 148.5 \ cm^2 \times 100$$

Hence, Rs. 14,850 is required for painting vertical facts of the given prism.



5. A cylinder has curved surface area of 208 cm^2 and radius 8.8 cm. Find its total surface area and volume. ($\pi = 3.14$) **Solution:** Given that Curved surface area of cylinder = $208 \ cm^2$ Radius = $8.8 \ cm$ As we know that Curved surface area of cylinder = $2\pi rh$ $208 \ cm^2 = 2 \times (3.14) \times (8.8 \ cm) \times h$ $208 \ cm^2 = 55.264 \ cm \times h$ Divide both sides by 55.264 cm $3.76 \ cm = h$ We have to calculate total surface area and volume of the given cylinder. Total surface area of cylinder = $2\pi rh + 2\pi r^2$ $= 2 \times 3.14 \times 8.8 \ cm \times 3.76 \ cm + 2 \times 3.14 \times (8.8 \ cm)^2$ $= 207.79 \ cm^2 + 486.32 \ cm^2$ $= 694.11 \ cm^2$ Volume of cylinder = $\pi r^2 h$ $= 3.14 \times (8.8 \text{ cm})^2 \times 3.76 \text{ cm}$ $= 3.14 \times 77.44 \ cm^2 \times 3.76 \ cm$ $=914.29 \ cm^{3}$ 6. The base area of one flat surface is $606 \text{ } \text{cm}^2$ and the height of cylinder is 28 cm. Find volume of the cylinder ($\pi = 3.14$). **Solution:** Given that Base area of one flat surface of the cylinder = $606 \ cm^2$ Height = 28 cmAs we know that Base area of one flat surface of the cylinder = πr^2 $606 \ cm^2 = 3.14 \times r^2$ $606 \ cm^2 = 3.14 \times r^2$ $192.99 \ cm^2 = r^2$ By taking square root on both sides: $13.89 \ cm = r$ We have to calculate volume of the given cylinder. Volume of cylinder = $\pi r^2 h$ $= 3.14 \times (13.89 \text{ cm})^2 \times 28 \text{ cm}$ $= 3.14 \times 192.9321 \ cm^2 \times 28 \ cm$ $\approx 16963 \ cm^3$



7. A wooden log is of the shape of a cylinder of radius 0.8 *m* and height of 2.5 *m* (π = 3.14). Find surface area and volume of the wooden log.

Solution: Given that

Radius of cylinder = r = 0.8 m, Height of cylinder = h = 2.5 m

As we know that

Total surface area of cylindrical wooden $\log = 2\pi rh + 2\pi r^2$

 $= 2 \times 3.14 \times 0.8 \ m \times 2.5 \ m + 2 \times 3.14 \times (0.8 \ m)^2$ = 12.56 m² + 4.0192 m² = 16.58 m²

Volume of cylindrical wooden $\log = \pi r^2 h$

$$= 3.14 \times (0.8 m)^2 \times 2.5 m$$

= 3.14 × 0.64 m² × 2.5 m
= 5.024 m³

8. An open drum has diameter of 0.6 *m* and height of 2.3 *m*. Find volume and surface area of the drum. ($\pi = 3.14$)

Solution: As drum is looking like a cylinder. Given that drum is open it means only one flat surface. Diameter of the drum = d = 0.6 m, Radius of the drum = r = 0.3 m, Height of the drum = h = 2.3 mAs we know that

Total surface area of the drum = $2\pi rh + \pi r^2$

 $= 2 \times 3.14 \times 0.3 \ m \times 2.3 \ m + 3.14 \times (0.3 \ m)^{2}$ = 4.3332 m² + 0.2826 m² = 4.6158 m² Volume of the drum = $\pi r^{2}h$ = 3.14 × (0.3 m)² × 2.3 m = 3.14 × 0.9 m² × 2.3 m = 6.5 m³

- 9. An open rectangular box has dimensions 80 $cm \times 60 cm \times 90 cm$.
 - (i) Find surface area.

(ii) What is the capacity of the box in litres?

How many packets can be packed in the box if each packet has dimensions $2 cm \times 3 cm \times 4.5 cm$. Solution: Given that a rectangular box with dimensions $80 cm \times 60 cm \times 90 cm$.

Length = 80 cm, Width = 60 cm, Height = 90 cm

(i) Surface area of rectangular box =
$$2(l \times w) + 2(w \times h) + 2(l \times h)$$

 $= 2(80\ cm \times 60\ cm) + 2(60\ cm \times 90\ cm) + 2(80\ cm \times 90\ cm)$

$$= 2(4800 \ cm^2) + 2(5400 \ cm^2) + 2(7200 \ cm^2)$$

 $= 9600 \ cm^2 + 10800 \ cm^2 + 14400 \ cm^2$

$$= 34800 \ cm^2$$



(ii) To find the capacity in litres, first of all calculate volume of the box.

Volume of rectangular box = $l \times w \times h$

$$= 80 \ cm \times 60 \ cm \times 90 \ cm$$

 $= 432000 \ cm^3$

To change the value in litres divide it by 1,000.

Volume of rectangular box in litres = $432000 \div 1000$ litres

= 432 *l*

Now, to find how many packets of dimensions $2 \ cm \times 3 \ cm \times 4.5 \ cm$ can be packed in the given rectangular box find the surface area of the packet.

Surface area of the packet =
$$2(l \times w) + 2(w \times h) + 2(l \times h)$$

= $2(2 \ cm \times 3 \ cm) + 2(3 \ cm \times 4.5 \ cm) + 2(2 \ cm \times 4.5 \ cm)$
= $2(6 \ cm^2) + 2(13.5 \ cm^2) + 2(9 \ cm^2)$
= $12 \ cm^2 + 27 \ cm^2 + 18 \ cm^2$
= $57 \ cm^2$

Now, divide the surface area of rectangular box by surface area of the packet.

 $34800 \ cm^2 \div 57 \ cm^2 = 610.52$ \$\approx 611 \text{ packets}\$

Hence, 611 packets can be packed in the given rectangular box.

10. A cylinder is placed on a wooden box of side 5 *cm*. The cylinder has a height of 6 *cm* and diameter 5 *cm*. Find the total volume of the solid. (both cylinder and

box) $\left(\pi = \frac{22}{7}\right)$.

Solution: There are two different solids cylinder and cube. To calculate the total volume we have to calculate volume both solids separately and then add. Given that height of cylinder is 6 cm and its diameter 5 cm.

As radius is half of diameter so, $r = 2.5 \ cm$

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

$$= 3.14 \times (2.5 \text{ cm})^2 \times 6 \text{ cm}$$
$$= 3.14 \times 6.25 \text{ cm}^2 \times 6 \text{ cm}$$
$$= 117.75 \text{ cm}^3$$
Volume of cube = $(l)^3$
$$= (5 \text{ cm})^3$$
$$= 5 \times 5 \times 5 \text{ cm}^3$$

 $= 125 \ cm^3$

$$= 117.75 \ cm^3 + 125 \ cm^3$$
$$= 242.75 \ cm^3$$



11. Find the volume and surface area of the triangular prism as shown below:



Solution: In given triangular prism, height of prism = 12 *cm* and length of all sides of the triangular base are 8 cm, 6 cm and 10 cm As we know that Volume of prism = Base area \times Height of prism Surface area of the prism = $2 \times$ Area of base of prism + Perimeter of base \times Height of prism As base of the prism is triangle so first, we have to calculate: Area of triangle = $\frac{1}{2} \times b \times h$ $=\frac{1}{2}\times 6\,cm\times 8\,cm=24\,cm^2$ Perimeter of triangle = 8 cm + 10 cm + 6 cm = 24 cmNow apply the value in the above formula Volume of prism = $24 \ cm^2 \times 12 \ cm$ $= 288 \ cm^3$ Surface area of the prism = $2 \times 24 \ cm^2 + 24 \ cm \times 12 \ cm$ $=48 \ cm^2 + 288 \ cm^2$ $= 336 \ cm^2$ 12. The base of a triangular prism is an isosceles triangle with base 10 cm and height 12 cm. The length of the prism is 20 cm. Find the volume and surface area of the triangular prism as shown. **Solution:** In given triangular prism, height of prism = 20 *cm* and length of all sides of the triangular base are 13 cm, 13 cm and 10 cm. As we know that Volume of prism = Base area \times Height of prism Surface area of the prism = $2 \times$ Area of base of prism + Perimeter of base \times Height of prism As base of the prism is triangle so first, we have to calculate: Area of triangle = $\frac{1}{2} \times b \times h$ $=\frac{1}{2}\times 10$ cm $\times 12$ cm $=60 \, cm^2$ Perimeter of triangle = 13 cm + 13 cm + 10 cm $= 36 \ cm$ Now apply the value in the above formula

Volume of prism = $60 \ cm^2 \times 20 \ cm$ $= 1200 \ cm^3$ Surface area of the prism = $2 \times 60 \ cm^2 + 36 \ cm \times 20 \ cm$ $= 120 \ cm^2 + 720 \ cm^2$ $= 840 \ cm^2$

