

Tender Heart High School, Sec.-33B chd.

Class: VIII

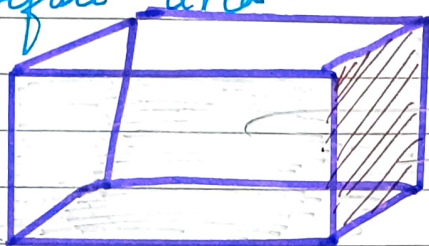
Teacher: Deepti

Subject: Mathematics

Topic: Chapter-24: Volume and Surface area of Solids

Any object that occupies space, is called solid.

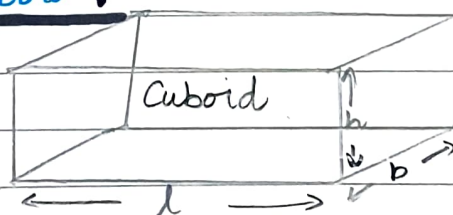
- Volume: The inner space occupied by an object is called volume.
- Surface area: The total area that the surface of the object occupies is its surface area.



- Lateral Surface: It is the measure of all the surface area excluding the top and bottom surface.

Formulas

1. Cuboid:



$$(i) T.S.A = 2(lb + bh + hl)$$

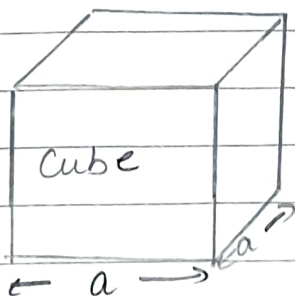
$$(ii) L.S.A = 2(l + b) \times h$$

$$(iii) \text{Area of 4 walls} = 2(l + b) \times h$$

$$(iv) \text{Diagonal} = \sqrt{l^2 + b^2 + h^2}$$

$$(v) \text{Volume} = l \times b \times h$$

2. Cube:



$$(i) T.S.A = 6a^2$$

$$(ii) L.S.A = 4a^2$$

$$(iii) \text{Diagonal} = a\sqrt{3}$$

$$(iv) \text{Volume} = a^3$$

Class: VIII

Subject: Mathematics

Topic: Chapter - 24:

Volume and Surface area

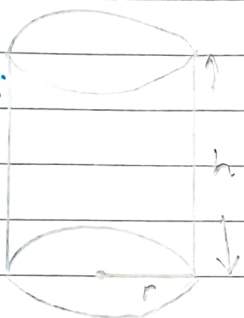
classmate

Date

Page

Teacher: Ms. Deepa

3. Cylinder:



(i) C.S.A (Curved Surface area)

$$= 2\pi rh$$

(ii) T.S.A (Total Surface area)

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

(iii) Volume = $\pi r^2 h$

Exercise - 24A

Soln. Dimensions of a room: $l = 15m$, $b = 4m$, $h = 60cm$
 $= 1500cm$ $= 400cm$

Volume of a room = $l \times b \times h = 1500 \times 400 \times 60$

Dimensions of a plank: $l = 5m$, $b = 24cm$, $h = 10cm$
 $= 500cm$

Volume of a plank = $l \times b \times h = 500 \times 24 \times 10$

No. of plank = $\frac{\text{Volume of a room}}{\text{Volume of a plank}}$

$$= \frac{1500 \times 400 \times 60}{500 \times 24 \times 10} = \boxed{300}$$

Soln. $l = 12m$, $b = 8m$, $h = 9m$

length of the longest pole that can be placed in a room = length of the diagonal of the room

$$\begin{aligned} &= \sqrt{l^2 + b^2 + h^2} \\ &= \sqrt{(12)^2 + (8)^2 + (9)^2} \\ &= \sqrt{144 + 64 + 81} \\ &= \sqrt{289} \\ &= 17m \end{aligned}$$

So, the length of longest pole is $\boxed{17m}$

Class: VIII

Subject: Mathematics

Topic: Chapter - 24

Teacher: Deepthi

Volume and Surface area

Qn 7. Volume of Cuboid = 972 m^3
 $l = 16 \text{ m}$, $b = 13.5 \text{ m}$, $h = ?$

$$\text{Volume} = 972$$

$$l \times b \times h = 972$$

$$16 \times 13.5 \times h = 972 \text{ or } 9$$

$$h = \frac{972}{16 \times 13.5} = \frac{9}{2} = 4.5 \text{ m}$$

Qn 10. $l = 8 \text{ m}$, $b = 6.5 \text{ m}$, $h = 3.5 \text{ m}$

$$\begin{aligned} \text{(i) Area of 4 walls} &= 2(l+b) \times h \\ &= 2(8+6.5) \times 3.5 \\ &= 2 \times 14.5 \times 3.5 \\ &= 101.5 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{(ii) Area of floor} &= l \times b \\ &= 8 \times 6.5 \\ &= 52 \text{ m}^2 \end{aligned}$$

Qn 12. Dimensions of a hall: $l = 45 \text{ m}$, $b = 30 \text{ m}$, $h = 16 \text{ m}$
Dimensions of a door: $l = 4 \text{ m}$, $b = 3.5 \text{ m}$
Dimensions of a window: $l = 2.5 \text{ m}$, $b = 1.6 \text{ m}$

$$\begin{aligned} \text{(i) Area of walls excluding doors and windows} &= \\ &= \text{Area of 4 walls} - 5 \times \text{Area of doors} - 4 \times \text{Area of windows} \\ &= 2(45+30) \times 16 - 5 \times 4 \times 3.5 - 4 \times 2.5 \times 1.6 \\ &= 2400 \text{ m}^2 - 70 \text{ m}^2 - 16 \text{ m}^2 \\ &= 2314 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Cost of papering its walls @ ₹ 35 per m}^2 &= 2314 \times 35 \\ &= ₹ 80990 \end{aligned}$$

$$\begin{aligned} \text{(ii) Area of Gilding floor} &= l \times b = 45 \times 30 = 1350 \text{ m}^2 \\ \text{Cost of Carpeting the floor} &= ₹ 154 \times 1350 \\ &= ₹ 207900 \end{aligned}$$

Class: VIII

Subject: Mathematics

Topic: Chapter-24

classmate

Date _____

Page _____

Teacher: Deepa

Volume and Surface area

Exercise - 24B

Volume of tank = 6160 m^3 , $h = ?$, $r = 14 \text{ m}$

Cost of painting its CSA = ?

Volume = 6160 m^3

$$\pi r^2 h = 6160$$

$$\frac{22}{7} \times 14^2 \times h = 6160$$

$$h = \frac{6160}{\frac{22 \times 2 \times 14}{7}} = 10 \text{ m}$$

$$\text{C.S.A} = 2\pi r h = 2 \times \frac{22}{7} \times 14 \times 10 = 880 \text{ m}^2$$

$$\text{Cost of painting it} = ₹ 30 \times 880 = ₹ 26400$$

$$\text{T.S.A} = 1320 \text{ cm}^2, r = 10 \text{ cm}, h = ?$$

$$\text{T.S.A} = 1320$$

$$2\pi r(r+h) = 1320$$

$$2 \times \frac{22}{7} \times 10(10+h) = 1320$$

$$\frac{440}{7}(10+h) = 1320$$

$$10+h = \frac{1320 \times 7}{440} = 21$$

$$h = 21 - 10 = 11 \text{ cm}$$

