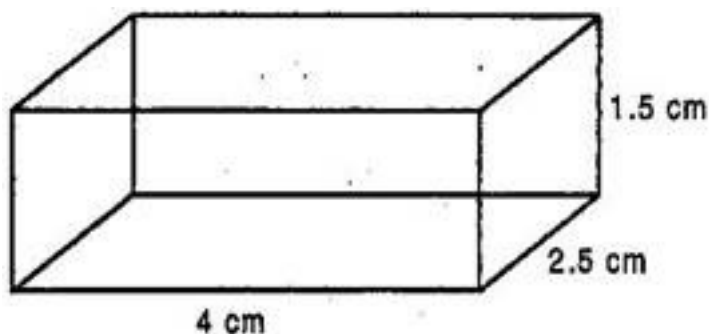


CBSE Class 9 Mathematics
NCERT Solutions
CHAPTER 13
Surface Areas and Volumes(Ex. 13.5)

1. A matchbox 4 cm x 2.5 cm x 1.5 cm. What will be the volume a packet containing 12 such boxes?



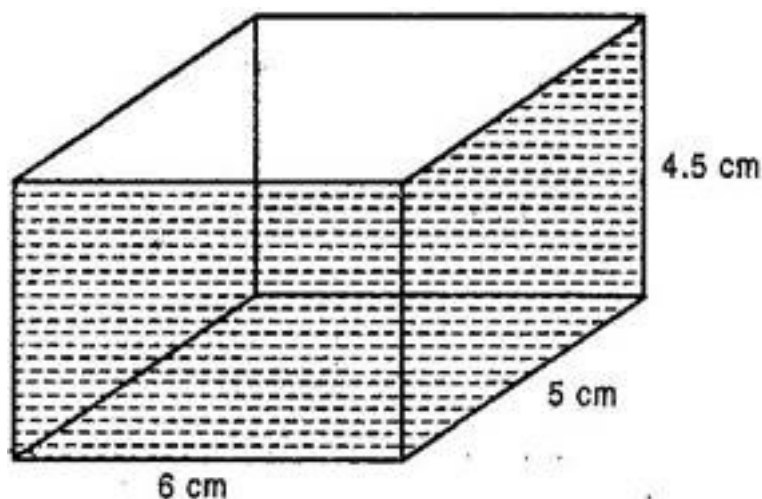
Ans. Given: Length (l) = 4 cm, Breadth (b) = 2.5 cm, Height (h) = 1.5 cm

Volume of a matchbox = $l \times b \times h = 4 \times 2.5 \times 1.5$

= 15 cm^3

\therefore Volume of a packet containing 12 such matchboxes = $12 \times 15 = 180 \text{ cm}^3$

2. A cubical water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold? ($1 \text{ m}^3 = 1000 \text{ l}$)



Ans. Volume of water in cuboidal tank = $6 \text{ m} \times 5 \text{ m} \times 4.5 \text{ m}$

$$= 135 \text{ m}^3 = 135 \times 1000 \text{ liters}$$

$$= 135000 \text{ liters}$$

Hence tank can hold 135000 liters of water.

3. A cuboidal vessel is 10 m long and 8 m wide. How high must it be to hold 380 cubic meters of a liquid?

Ans. Let height of cuboidal vessel = h m

$$\text{Volume of liquid in cuboidal vessel} = 380 \text{ m}^3$$

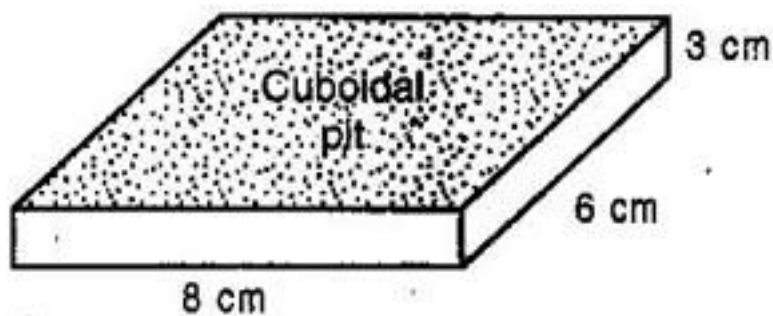
$$\Rightarrow l \times b \times h = 380 \text{ m}^3$$

$$\Rightarrow 10 \text{ m} \times 8 \text{ m} \times h = 380$$

$$\Rightarrow h = \frac{380}{10 \times 8} = 4.75 \text{ m}$$

Hence cuboidal vessel is 4.75 m high.

4. Find the cost of digging a cuboidal pit 8 m long, 6 m broad and 3 m deep at the rate of Rs. 30 per m^3 .



Ans. Volume of cuboidal pit = $8 \text{ m} \times 6 \text{ m} \times 3 \text{ m} = 144 \text{ m}^3$

$$\therefore \text{Cost of digging } 1 \text{ m}^3 \text{ cuboidal pit} = \text{Rs. } 30$$

$$\therefore \text{Cost of digging } 144 \text{ m}^3 \text{ cuboidal pit} = 30 \times 144 = \text{Rs. } 4320$$

5. The capacity of a cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its length and depth are respectively 2.5 m and 10 m.

$$(1 \text{ m}^3 = 1000 \text{ l})$$

Ans. Capacity of cuboidal tank = 50000 liters

$$\Rightarrow l \times b \times h = 50000 \text{ liters}$$

$$\Rightarrow 2.5 \text{ m} \times b \times 10 \text{ m} = \frac{50000}{1000} \text{ m}^3 \quad [\because 1000 \text{ l} = 1 \text{ m}^3]$$

$$\Rightarrow 25 \times b = 50$$

$$\Rightarrow b = 2 \text{ m}$$

Hence breadth of cuboidal tank is 2 m.

6. A village having a population of 4000 requires 150 litres of water per head per day. It has a tank measuring 20 m by 15 m by 6 m. For how many days will the water of this tank last?

Ans. Capacity of cuboidal tank = $l \times b \times h = 20 \text{ m} \times 15 \text{ m} \times 6 \text{ m}$

$$= 1800 \text{ m}^3 = 1800 \times 1000 \text{ liters}$$

$$[\because 1000 \text{ l} = 1 \text{ m}^3]$$

$$= 1800000 \text{ liters}$$

Water required by per head per day = 150 liters

Water required by 4000 persons per day = $150 \times 4000 = 600000 \text{ liters}$

$$\text{Number of days the water will last} = \frac{\text{Capacity of tank (in liter)}}{\text{Total water required per day (in liters)}}$$

$$= \frac{1800000}{600000} = 3$$

Hence water of the given tank will last for 3 days.

7. A godown measures 40 m x 25 m x 15 m. Find the maximum number of wooden crates each measuring 1.5 m x 1.25 m x 0.5 m that can be stored in the godown.

Ans. Capacity of cuboidal godown = 40 m x 25 m x 15 m = 15000 m³

Capacity of wooden crate = 1.5 m x 1.25 m x 0.5 m = 0.9375 m³

$$\begin{aligned}\text{Maximum number of crates that can be stored in the godown} &= \frac{\text{Volume of godown}}{\text{Volume of one crate}} \\ &= \frac{15000}{0.9375} = 16000\end{aligned}$$

Hence maximum 16000 crates can be stored in the godown.

8. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Find the ratio between their surface areas.

Ans. Given: Side of a solid cube (A) = 12 cm

Then, Volume of bigger cube = 12 x 12 x 12 = 1728 cm³

Number of smaller cubes = 8

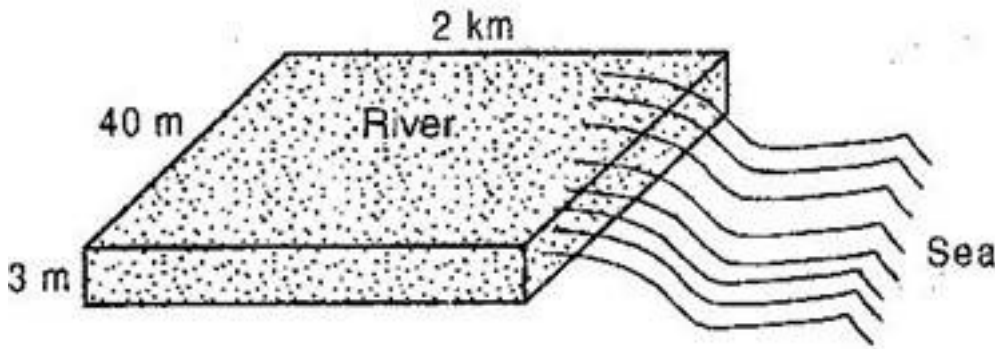
Then, Volume of smaller cube (a³) = $\frac{1728}{8} = 216 \text{ cm}^3$

$$\Rightarrow \text{Side of smaller cube (a)} = (216)^{\frac{1}{3}} = 6 \text{ cm}$$

$$\begin{aligned}\text{Now, Required ratio} &= \frac{6A^2}{6a^2} = \frac{A^2}{a^2} \\ &= \frac{(12)^2}{(6)^2} = \frac{144}{36} = \frac{4}{1}\end{aligned}$$

Therefore, the required ratio is 4 : 1.

9. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?



Ans. Since water flows at the rate of 2 km per hour, the water from 2 km of the river flows into the sea in one hour.

Therefore, the volume of water flowing into the sea in one hour = Volume of a cuboid

$$= l \times b \times h = 2000 \text{ m} \times 40 \text{ m} \times 3 \text{ m}$$

$$= 240000 \text{ m}^3 [1 \text{ km} = 1000 \text{ m}]$$

Now, Volume of water flowing into sea in 1 hour (in 60 minutes) = 240000 m^3

$$\therefore \text{Volume of water flowing into sea in 1 minute} = \frac{240000}{60} = 4000 \text{ m}^3$$