

NCERT Solutions for Class 9 Maths Chapter 11 Surface Areas and Volumes Ex 11.5

Question 1.

A matchbox measures 4 cm × 2.5 cm × 1.5 cm. What will be the volume of a packet containing 12 such boxes?

Solution.

Matchbox is a cuboid having its length (l), breadth (b), height (h) as 4 cm, 2.5 cm and 1.5 cm respectively

Volume of 1 match box = $l \times b \times h$

$$= (4 \times 2.5 \times 1.5) \text{ cm}^3$$

$$= 15 \text{ cm}^3$$

Volume of 12 such matchboxes = $(15 \times 12) \text{ cm}^3$

$$= 180 \text{ cm}^3$$

Therefore, the volume of 12 match boxes is 180 cm^3

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Question 2.

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

Solution.

The given cuboidal water tank has its length (l) as 6 m, breadth (b) as 5 m and height (h) as 4.5 m respectively

Volume of tank = $l \times b \times h$

$$= (6 \times 5 \times 4.5) \text{ m}^3$$

$$= 135 \text{ m}^3$$

Amount of water that 1 m^3 volume can hold = 1000 litres

Amount of water that 135 m^3 volume can hold = (135×1000) litres

$$= 135000 \text{ litres}$$

Question 3.

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

Solution. Let the height of the cuboidal vessel be h

Length (l) of vessel = 10 m

Width (b) of vessel = 8 m

Volume of vessel = 380 m^3

$$l \times b \times h = 380$$

$$[(10)(8)h] \text{ m}^3 = 380 \text{ m}^3$$

Therefore, the height of the vessel should be 4.75 m

Question 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

Solution.

The given cuboidal pit has its length (l) as 8 m, width (b) as 6 m, and depth (h) as 3 m respectively

Volume of pit = $l \times b \times h$

$$= (8 \times 6 \times 3) \text{ m}^3$$

$$= 144 \text{ m}^3$$

Cost of digging per m^3 volume = Rs 30

Cost of digging 144 m^3 volume = Rs (144×30)

$$= \text{Rs } 4320$$

Question 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

Solution.

Let the breadth of the tank be b m

Length (l) and depth (h) of tank is 2.5 m and 10 m respectively

Volume of tank = $l \times b \times h$

$$= (2.5 \times b \times 10) \text{ m}^3$$

$$= 25b \text{ m}^3$$

Capacity of tank = $25b \text{ m}^3 = 25000 \text{ b litres}$

$$25000 \text{ b} = 50000$$

$$b = 2$$

Therefore, the breadth of the tank is 2 m

Question 6.

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

Solution.

The given tank is cuboidal in shape having its length (l) as 20 m, breadth (b) as 15 m, and height (h) as 6 m respectively

Capacity of tank = $l \times b \times h$

$$= (20 \times 15 \times 6) \text{ m}^3$$

$$= 1800 \text{ m}^3$$

$$= 1800000 \text{ litres}$$

Water consumed by the people of the village in 1 day = $(4000 \times 150) \text{ litres}$

$$= 600000 \text{ litres}$$

Let water in this tank last for n days

Water consumed by all people of village in n days = Capacity of tank

$$n \times 600000 = 1800000$$

$$n = 3$$

Therefore, the water of this tank will last for 3 days

Question 7.

A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown

Solution.

The godown has its length (l_1) as 40 m, breadth (b_1) as 25 m, height (h_1) as 10 m, while the wooden crate has its length (l_2) as 1.5 m, breadth (b_2) as 1.25 m, and height (h_2) as 0.5 m respectively

Therefore,

$$\text{Volume of godown} = l_1 \times b_1 \times h_1$$

$$= (40 \times 25 \times 10)$$

$$= 10000 \text{ m}^3$$

$$\text{Volume of 1 wooden crate} = l_2 \times b_2 \times h_2$$

$$= (1.5 \times 1.25 \times 0.5)$$

$$= 0.9375 \text{ m}^3$$

Let n wooden crates can be stored in the godown

Therefore, volume of n wooden crates = Volume of godown

$$0.9375 \times n = 10000$$

$$n = \frac{10000}{0.9375}$$

$$= 10666.66$$

Question 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? Also, find the ratio between their surface areas

Solution.

$$\text{Side (a) of cube} = 12 \text{ cm}$$

$$\text{Volume of cube} = (a)^3 = (12 \text{ cm})^3 = 1728 \text{ cm}^3$$

Let the side of the smaller cube be a_1

$$\text{Volume} = \left(\frac{1728}{8}\right)$$

$$= 216 \text{ cm}^3$$

$$(a_1)^3 = 216 \text{ cm}^3$$

$$a_1 = 6 \text{ cm}$$

$$\text{Ratio} = \frac{\text{Surface area of bigger cube}}{\text{Smaller area of smaller cube}}$$

$$= \frac{12 \times 12}{6 \times 6}$$

$$= \frac{4}{1}$$

$$\text{Ratio} = 4: 1$$

Question 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?

Solution.

Rate of water flow = 2 km per hour

$$= \left(\frac{2000}{60}\right) \text{ m/ min}$$

$$= \left(\frac{100}{3}\right) \text{ m/ min}$$

Depth (h) of river = 3 m

Width (b) of river = 40 m

$$\text{Volume of water flowed in 1 min} = \left(\frac{100}{3}\right) * 40 * 3$$

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

Therefore, in 1 minute, 4000 m³ water will fall in the sea