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

Solution:

Dimensions of a matchbox (a cuboid) are l x b x h = 4 cm x 2.5 cm x 1.5 cm respectively
Formula to find the volume of matchbox = l x b x h = (4 x 2.5 x 1.5) = 15
Volume of matchbox = 15 cm^3
Now, volume of 12 such matchboxes = (15x 12)cm^3 = 180 cm^3
Therefore, the volume of 12 matchboxes is 180 cm^3.

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 m^3= 1000 l)**

Solution:

Dimensions of a cuboidal water tank are: l = 6 m and b = 5 m and h = 4.5 m
Formula to find volume of tank , V = l x b x h
Put the values, we get
V = (6 x 5 x 4.5) = 135
Volume of water tank is 135 m^3
Again,
We are given that, amount of water that 1m^3 volume can hold = 1000 l
Amount of water, 135 m^3 volume hold = (135 x 1000) litres = 135000 litres
Therefore, given cuboidal water tank can hold up to 135000 litres of water.

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:
Given:
Length of cuboidal vessel, l = 10 m
Width of cuboidal vessel , b = 8 m
Volume of cuboidal vessel, V = 380 m^3

Let the height of the given vessel be h.

Formula for Volume of a cuboid, V = l x b x h

Using formula, we have
l x b x h = 380
(10) (8) h = 380
Or h = 4.75
Therefore, the height of the vessels is 4.75 m.

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 pit has its length (l) as 8 m, width (b)as 6 m, and depth (h) as 3 m.
Volume of cuboidal pit = l x b x h = (8 x 6 x 3) = 144 (using formula)
Required Volume is 144 m^3
Now,
Cost of digging per m^3 volume = Rs 30
Cost of digging 144 m^3 volume = Rs(144 x30) = 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.

Solution:

Length (l) and depth (h) of tank is 2.5 m and 10 m respectively.
To find: The value of breadth, say b.
Formula to find the volume of a tank = l x b x h
= (2.5 x b x 10) m^3= 25b m^3
Capacity of tank = 25b m^3 , which is equal to 25000b litres
Also, capacity of a cuboidal tank is 50000 litres of water (Given)
Therefore, 25000 b = 50000
This implies, b = 2
Therefore, the breadth of the 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 x 15 m x 6 m. For how many days will the water of this tank last?

Solution:

Length of the tank = l = 20 m
Breadth of the tank = b = 15 m
Height of the tank = h = 6 m
Total population of a village = 4000
Consumption of the water per head per day = 150 litres

Water consumed by
the people in 1 day = (4000× 150) litres = 600000 litres …(1)

Formula to find the capacity of tank, C = l x b x h
Using given data, we have
C = (20 x 15 x 6) m^3 = 1800 m^3
Or C = 1800000 litres

Let water in this tank last for d days.
Water consumed by all people in d days = Capacity of tank (using equation (1))
600000 d = 1800000
d = 3
Therefore, the water of this tank will last for 3 days. **Answer**

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.

Solution:
From statement, we have
Length of the godown = 40 m
Breadth = 25 m
Height = 15 m
Whereas,
Length of the wooden crate = 1.5 m
Breadth = 1.25 m
Height = 0.5 m
Since godown and wooden crate are in cuboidal shape. Find the volume of each using formula, V = lbh.
Now,
Volume of godown = (40 x 25 x 15) m^3 = 10000 m^3
Volume of a wooden crate = (1.5 x 1.25 x 0.5) m^3 = 0.9375 m^3

Let us consider that, n wooden crates can be stored in the godown, then
Volume of n wooden crates = Volume of godown

0.9375 x n = 10000
Or n = 10000/0.9375 = 10666.66

Hence, the number of wooden crates can be stored in a godown are 10666.

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:

Side of a cube = 12 cm (Given)
Find the volume of cube:
Volume of cube = $(Side)^3 = (12)^3\ cm^3 = 1728\ cm^3$
Surface area of a cube with side 12 cm = $6a^2 = 6(12)^2\ cm^2$ …(1)
Cube is cut into eight small cubes of equal volume, say side of each cube is p.
Volume of a small cube = p^3
Surface area = $6p^2$ …(2)
Volume of each small cube = $(1728/8)\ cm^3 = 216\ cm^3$
Or $(p)^3 = 216\ cm^3$
Or p = 6 cm
Now, Surface areas of the cubes ratios = (Surface area of bigger cube)/ (Surface area of smaller cubes)
From equation (1) and (2), we get
Surface areas of the cubes ratios $= (6a^2)/(6p^2) = a^2/p^2 = 12^2/6^2 = 4$
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?

Solution:
Given:
Depth of river, h = 3 m
Width of river, b = 40 m
Rate of water flow = 2 km per hour = 2000 m / 60 min = 100/3 m/min
Now, Volume of water flowed in 1 min = $(100/3 \times 40 \times 3) = 4000\ m^3$
Therefore, $4000\ m^3$ water will fall into the sea in a minute.