

13.5

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

Here $l = 6\text{m}$
 $b = 5\text{m}$
 $h = 4.5\text{m}$

$$\begin{aligned}\text{Volume of Cuboid} &= l \times b \times h \\ &= 6 \times 5 \times 4.5 \\ &= 135\text{m}^3\end{aligned}$$

We know $1\text{m}^3 = 1000\text{L}$

$$\begin{aligned}\text{Volume of cuboidal tank} &= 135 \times 1000 \\ &= 135000\text{L}\end{aligned}$$

- 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 2.5m and 10m.

$$\rightarrow \text{Volume} = 50000 \text{ l} \quad l = 2.5 \text{ m} \quad b = ?$$

$$h = 10 \text{ m}$$

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

$$\text{Volume in } \text{m}^3 = \frac{50000}{1000} = 50 \text{ m}^3$$

$$\text{Volume of Cuboid} = l \times b \times h$$

$$50 \text{ m}^3 = 2.5 \times 10 \times b$$

$$50 \text{ m}^3 = 25 \times b$$

$$25 \times b = 50 \text{ m}^3$$

$$b = \frac{50}{25} = 2 \text{ m}$$

- ⑥ A village having a population of 4000 requires 150 litres of water per head per day. It has tank measuring 90m x 15m x 6m. For how many days will the water of this tank last?

$$\rightarrow l = 90 \text{ m}, b = 15, h = 6$$

$$\text{Volume of Cuboid} = l \times b \times h$$

$$= 90 \times 15 \times 6$$

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



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$$\begin{aligned}\text{Capacity of tank} &= 1800 \times 1000 \\ &= 18,00,000 \text{ l}\end{aligned}$$

For 1 person for 1 day water supplied
= 150 litre

$$\begin{aligned}\text{For all 4000 people water supplied} &= 150 \times 4000 \\ &= 6,00,000 \text{ litre}\end{aligned}$$

Number of days water will last = $\frac{\text{Capacity of tank}}{\text{water required for 1 day}}$

$$= \frac{18,00,000}{6,00,000}$$

$$= 3 \text{ days}$$

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

$$\begin{aligned}\text{Here, } l &= 4 \text{ cm} \\ b &= 2.5 \text{ cm} \\ h &= 1.5 \text{ cm}\end{aligned}$$

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$$\begin{aligned}\text{Volume of cuboid} &= l \times b \times h \\ &= 4 \times 2.5 \times 15 \\ &= 150 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume of packet containing 12 such boxes} &= 15 \times 12 \\ &= 180 \text{ cm}^3\end{aligned}$$

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.

$$l = 10 \text{ m}$$

$$b = 8 \text{ m}$$

$$h = ?$$

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

$$380 \text{ m}^3 = 10 \text{ m} \times 8 \times h$$

$$380 \text{ m}^3 = 80 \text{ m} \times h$$

$$80 \text{ m} \times h = 380 \text{ m}^3$$

$$h = \frac{380}{80} = 4.75$$

$$h = 4.75 \text{ m}$$



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

$$l = 8m$$

$$b = 6m$$

$$h = 3m$$

$$\begin{aligned}\text{volume of cuboid} &= l \times b \times h \\ &= 8 \times 6 \times 3 \\ &= 144m^3\end{aligned}$$

$$\text{rate of digging per } m^3 = ₹ 30$$

$$\begin{aligned}\text{rate of digging per } 144m^3 &= 30 \times 144 \\ &= ₹ 4320\end{aligned}$$

⑤ A godown measures 40m $\times$ 25m $\times$ 15m. Find the maximum number of wooden crates each measuring 1.5m $\times$ 1.25m $\times$ 0.5m that can be stored in the godown.

$$\begin{aligned}\text{volume of godown} &= l \times b \times h \\ &= 40 \times 25 \times 15\end{aligned}$$

$$\text{Volume of crates} = 1 \times 1.5 \times 0.5$$

$$= 1.5 \times 1.25 \times 0.5$$

$$\text{No. of crates} = \frac{\text{Volume of godown}}{\text{Volume of crates}}$$

$$= \frac{110 \times 25 \times 15}{1.5 \times 1.25 \times 0.5}$$

$$= \frac{110 \times 25 \times 15 \times 10000}{15 \times 125 \times 5}$$

$$= \frac{8 \times 10000}{3}$$

$$= \frac{16000}{3}$$

$$= 5333.33$$

$$\text{No. of crates} = 16000$$



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

→ Here, $a = 12 \text{ cm}$

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

$$\text{Volume of one smaller cube} = \frac{1728 \text{ cm}^3}{8}$$

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

Let side of the new cube ~~be~~ be A

$$= A^3 = 216$$

$$A = \sqrt[3]{216} = 6$$

Side of the new cube = 6 cm

$$\text{Surface area of solid cube} = 6a^2$$

$$= 6 \times (12)^2 \times 12$$

$$= 6 \times 144$$

$$= 864 \text{ cm}^2$$

Surface area of New Cube $= 6a^2$
 $= 6 \times 6 \times 6$

$$\text{ratio} = \frac{6 \times 12^2 \times 12^2}{6 \times 6 \times 6} = \frac{4}{1} = 4:1$$

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

→ Here, $b = 40\text{m}$

$$h = 3\text{m}$$

$$l = 2\text{km} = 2 \times 1000 = 2000\text{m}$$

Volume of water flowing through the river in one hour.

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

$$= 40 \times 3 \times 2000$$

$$= 120 \times 2000$$

$$= 240,000$$



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∴ Volume of water flowing through the river in 1 minute

$$2 \times 2000 \times \frac{20^2}{40} \times 31 \text{ m}^3$$

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