RD SHARMA

Solutions

Class 8 Maths

Chapter 21

Ex 21.2

Q 1. Find the volume in cubic metre (cu .m) of each of the cuboids whose dimensions are :

i) Length = 12 m, Breadth = 10 m , height = 4.5 m

ii) Length = 4 m, Breadth = 2.5 m , height = 50 cm

iii) Length = 10 m, Breadth = 25 dm , height = 25 cm

Soln:

i) Length = 12 m

Breadth = 10 m

Height = 4. 5 m

Volume of the cuboid = length x breadth x height = 12 x 10 x 4.5 = 540 m^3

ii) Length = 4 m

Breadth = 2.5 m

Height = 50 cm

= $\frac{50}{100}$ m (therefore, 1 m = 100 cm)

Volume of the cuboid = length x breadth x height = 4 x 2.5 x 0.5 = 5 m^3

Q 2. Find the volume in cubic decimeter of each of the cubes whose side is :

i) 1.5 m

ii) 75 cm

iii) 2 dm 5 cm

Soln :

i) Side of the cube = 1.5 m

= 1.5 x 10 dm (Because 1 m = 10 dm)

= 15 dm

Therefore, Volume of the cube = $(side)^3$ = $(\ 15\ )^3$ = 3375 dm^3

ii) Side of the cube = 75 cm

= 75 x $\frac{1}{10}$ dm (because 1 dm = 10 cm)

= 7.5 dm

Therefore, Volume of the cube = $(\ side\ )^3$ = $(\ 7.5\ )^3$ = 421.875 dm^3

iii) Side of the cube = 2 dm 5 cm

= 2 dm + 5 x $\frac{1}{10}$ dm (Because 1 dm = 10 cm)

= 2 dm + 0.5 dm = 2.5 dm

Therefore, Volume of the cube = $(\ side\ )^3$ = $(\ 2.5\ )^3$ = 15.625 dm^3

Q3. How much clay is dug out in digging a well measuring 3 m by 2 m by 5 m ?

Soln:

The measure of well is 3 m x 2 m x 5 m

Therefore, volume of the clay dug out = $(\ 3 \text{ x } 2 \text{ x } 5\ )\ m^3$ = 30 m^3

Q4. What will be the height of cuboid of volume 168 m^3 , if the area of its base is 28 m^2 ?

Soln:

Volume of the cuboid = 168 m^3

Area of its base = 28 m^2

Let h m be the height of the cuboid.

Now, we have the following :

Area of the rectangular base = length x breadth

Volume of the cuboid = length x breadth x height

Volume of the cuboid = (area of the base) x height

168 = 28 x h

h = $\frac{168}{28}$ = 6 cm

Therefore, the height of the cuboid is 6 m.

Q 5. A tank is 8 m long, 6 m broad and 2 m high. How much water can it contain ?

Soln:

Length of the tank = 8 m

Breadth = 6 m

Height = 2 m

Therefore, Its volume = length x breadth x height = (8 x 6 x 2) m^3 = 96 m^3

We know that 1m^3 = 1000 L

Now, 96 m^3 = 96 x 1000 L = 96000 L

Therefore, the tank can store 96000 L of water.

Q 6. The capacity of a certain cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its height and length are 10 m and 2.5 m respectively.

Soln:

Capacity of the cuboidal tank = 50000 L

1000 L = 1 m^3

i.e. , 50000 L = 50 x 1000 litres = 50 m^3

Therefore, the volume of the tank is 50 m^3.

Also, it is given that the length of the tank is 10 m.

Height = 2.5 m

Suppose that the breadth of the tank is b m.

Now, volume of the cuboid = length x breadth x height

50 = 10 x b x 2.5

50 = 25 x b

b = $\frac{50}{25}$ = 2 cm

Therefore, the breadth of the tank is 2 m.

Q 7. A rectangular diesel tanker is 2 m long, 2 m wide and 40 cm deep. How many litres of diesel can it hold?

Soln:

Lenght of the rectangular diesel tanker = 2 m

Breadth = 2 m

Height = 40 cm

= 40 x $\frac{1}{100}$ m (therefore, 1 m = 100 cm)

= 0.4 m

So, volume of the tanker = length x breadth x height

= 2 x 2 x 0.4 = 1.6 m^3

We know that 1 m^3 = 1000 L

i.e., 1.6 m^3 = 1.6 x 1000 L = 1600 L

Therefore, the tanker can hold 1600 L of diesel.

Q 8. The length, breadth, and height of a room are 5 m , 4.5 m and 3 m, respectively. Find the volume of the air it contains.

Soln:

Length of the room = 5 m

Breadth = 4.5 m

Height = 3 m

Now, volume = length x breadth x height

= 5 x 4. 5 x 3

= 67. 5 m^3

Therefore, the volume of air in the room is 67.5 m^3.

Q 9. A water tank is 3 m long, 2 m broad and 1 m deep. How many liters of water can it hold?

Soln:

Length of the water tank = 3 m

Breadth = 2 m

Height = 1 m

Volume of the water tank = 3 x 2 x 1= 6 m^3

We know that 1 m^3 = 1000 L

i.e. , 6 m^3 = 6 x 1000 L = 6000 L

Therefore, the water tank can hold 6000 L of water in it.

Q 10. How many planks each of which is 3 m long, 15 cm broad and 5 cm thick can be prepared from a wooden block 6 m long , 75 cm broad and 45 cm thick ?

Soln:

Length of the wooden block = 6 m

= 6 x 100 cm (Because 1 m = 100 cm)

= 600 cm

Breadth of the block = 75 cm

Height of the block = 45 cm

Volume of block = length x breadth x height = 600 x 75 x 45 = 2025000 cm^3

Again, it is given that the length of a plank = 3 m = 3 x 100 cm (because 1 m = 100 cm)

= 300 cm

Breadth = 15 cm

Height = 5 cm

Volume of the plank = length x breadth x height

= 300 x 15 x 5 = 22500 cm^3

Therefore, the number of such planks = $\frac{\text{volumeofthewoodenblock}}{\text{volumeofaplank}}$

= $\frac{2025000cm^3}{22500cm^3} = 90$

Q 11. How many bricks will each of size 25 cm x 10 cm x 8 cm be required to build a wall 5 m long, 3 m high and 16 cm thick, assuming that the volume of sand and cement used in the construction is negligible?

Soln:

Dimension of a brick = 25 cm x 10 cm x 8 cm

Volume of a brick = 25 cm x 10 cm x 8 cm = 2000 cm^3

Also, it is given that the length of the wall is 5 m = 5 x 100 cm (Because 1 m = 100 cm) = 500 cm

Height of the wall = 3 m = 3 x 100 cm (because 1 m = 100 cm) = 300 cm

It is 16 cm thick, i.e. , breadth = 16 cm

Volume of the wall = length x breadth x height = 500 x 300 x 16 = 2400000 cm^3

Therefore, The number of bricks needed to build the wall = $\frac{\text{volumeofthewall}}{\text{volumeofabrick}}$

= $\frac{2400000cm^3}{2000cm^3} = 1200$

Q 12. A village , having a population of 4000, requires 150 litres water per head per day. It has a tank which is 20 m long, 15 m broad and 6 m high. For how many days will the water of this tank last?

Soln:

A village has population of 4000 and every person needs 150 L of water a day.

So, the total requirement of water in a day = 4000 x 150 L = 600000 L

Also, it is given that the length of the water tank is 20 m.

Breadth = 15 m

Height = 6 m

Volume of the tank = length x breadth x height = 20 x 15 x 6 = 1800 m3

Now, 1 m3 = 1000 L

i.e. , 1800 m3 = 1800 x 1000 L = 1800000 L

The tank has 1800000 L of water in it and the whole village needs 600000 L per day.

Therefore, The water in the tank will last for $\frac{1800000cm^3}{600000cm^3}$ days, i.e., 3 days.

Q 13. A rectangular field is 70 m long and 60 m broad. A well of dimensions 14 m x 8 m x 6 m is dug outside the field and the earth dug – out from this well is spread evenly on the field. How much will the earth level rise ?

Soln:

Dimension of the well = 14 m x 8m x 6m

The volume of the dug — out earth = 14 x 8 x 6 = 672 m^3

Now, we will spread this dug — out earth on a field whose length, breadth and height are 70 m, 60 m and h m, respectively.

Volume of the dug — out earth = length x breadth x height = 70 x 60 x h

672 = 4200 x h

$h = \frac{672}{4200} = 0.16$ m

We know that 1 m = 100 cm

Therefore, the earth level will rise by 0.16 m = 0.16 x 100 cm = 16 cm.

Q 14. A swimming pool is 250 m long and 130 m wide. 3250 cubic meters of water is pumped into it. Find the rise in the level of water.

Soln:

Length of the pool = 250 m

Breadth of the pool = 130 m

Also, it is given that 3250 m^3 of water is poured into it.

i.e. , volume of water in the pool = 3250 m^3

Suppose that the height of the water level is h m.

Then, volume of the water = length x breadth x height

3250 = 250 x 130 x h

3250 = 32500 x h

$h = \frac{3250}{32500} = 0.1$ m

Therefore, the water level in the tank will rise by 0.1 m.

Q 15. A beam 5 m long and 40 cm wide contains 0.6 cubic meters of wood. How thick is the field on that day?

Soln:

Length of the beam = 5m

Breadth = 40 cm

$= 40 \times \frac{1}{100} = 0.4$ m (Because 100 cm = 1 m)

Suppose that the height of the beam is h m.

Also, it is given that the beam contains 0.6 cubic metre of wood.

i.e. , volume of the beam = 0.6 m^3

Now, volume of the cuboidal beam = length x breadth x height

6 = 5 x 0. 4 x h

0.6 = 2 x h

$h = \frac{0.6}{2} = 0.3$ m

= 0.3 m

Therefore, the beam is 0.3 m thick.

Q 16. The rainfall on a certain day was 6 cm. How many liters of water fell on 3 hectares of the field on that day?

Soln:

The rainfall on a certain day = 6 cm

$= \frac{6}{100} = 0.06$ m (Because 1 m = 100 cm) = 0.06 m

Area of the field = 3 hectares

We know that 1 hectare = 10000 m^2

i.e. , 3 hectares = 3 x 10000 m^2 = 30000 m^2

Thus, volume of rain water that fell in the field = (area of the field) x (height of rainfall)

= 30000 x 0.06 = 1800 m^3

Since 1 m^3 = 1000 L,

We have : 1800 m^3 = 1800 x 1000 L = 1800000 L = 18 x 100000 L = 18 x 10^5 L

Therefore, on that day, 18 x 10^5 L of rain water fell on the field.

Q 17. An 8 m long cuboidal beam of wood when sliced produces four thousand 1 cm cubes and there are no wastages of wood in this process. If one edge of the beam is 0.5 m, find the third edge.

Soln:

Length of the wooden beam = 8 m

Width = 0.5 m

Suppose that the height of the beam is h m

Then, its volume = length x width x height = 8 x 0.5 x h = 4 x h m^3

Also, it produces 4000 cubes, each of edge 1 cm = 1 x 1 m = 0.01 m (100 cm = 1 m)

Volume of a cube = $(side)^3$ = $(0.01)^3$ = 0.000001 m^3

Volume of 4000 cubes = 4000 x 0.000001 = 0.004 m^3

Since there is no wastage of wood in preparing cubes, the volume of the 4000 cubes will be equal to the volume of the cuboidal beam.

i.e. , Volume of the cuboidal beam = volume of 4000 cubes

4 x h = 0.004

h = $\frac{0.004}{4}$ = 0.001 m

Therefore, the third edge of the cuboidal wooden beam is 0.001 m.

Q 18. The dimensions of a metal block are 2.25 m by 1.5 m by 27 cm. it is melted and recast into cubes, each of the side 45 cm. How many cubes are formed?

Soln:

Dimension of the metal block is 2.25 m x 1.5 m x 27 cm,

i.e. , 225 cm x 150 cm x 27 cm (1 m = 100 cm).

Volume of the metal block = 225 x 150 x 27 = 911250 cm^3

This metal block is melted and recast into cubes each of side 45 cm.

Volume of a cube = $(side)^3$ = 45^3 = 91125 cm^3

The number of such cubes formed from the metal block

= $\frac{Volume\ of\ the\ metal\ block}{Volume\ of\ a\ metal\ cube}$

= $\frac{911250 cm^3}{91125 cm^3}$

= 10

Q 19. A solid rectangular piece of iron measures 6 cm by 6 cm by 2 cm. Find the weight of this piece, if 1 cm^3 of iron weighs 8 gm.

Soln:

The dimensions of the an iron piece is 6 m x 6 cm x 2 cm,

i.e. , 600 cm x 6 cm x 2 cm (therefore, 1 m = 100 cm).

Its volume = 600 x 6 x 2 = 7200 cm^3

Now, 1 cm^3 = 8 gm

i.e., 7200 cm^3 = 7200 x 8 gm = 57600 gm

Therefore, Weight of the iron piece = 57600 gm = 57600 x $\frac{1}{1000}$ kg (Because 1 Kg = 1000 gm) = 57.6 kg

Q 20. Fill in the blanks in each of the following so as to make the statement true :

i) 1 m3 = _____ cm^3

ii) 1 litre = _____ cubic decimeter

iii) 1 kl = _____ m^3

iv) the volume of a cube of side 8 cm is _____

v) the volume of a wooden cuboid of length 10 cm and breadth 8 cm is 4000 cm^3. The height of the cuboid is _____ cm

vi) 1 cu. dm = _____ cu. mm

vii) 1 cu . km = _____ cu . m

viii) 1 litre = _____ cu. cm

ix) 1 ml = _____ cu . cm

x) 1 kl = _____ cu. Dm = _____ cu. cm

Soln:

i) 1 m^3 = 1m x 1m x 1 m

= 100 cm x 100 cm x 100 cm (because 1 m = 100 cm)

= 1000000 cm^3 = 10^6 cm^3

ii) 1 L = $\frac{1}{1000}$ m^3

= $\frac{1}{1000}$ x 1 m x 1 m x 1 m

= $\frac{1}{1000}$ x 10 dm x 10 dm x 10 dm = 1 dm^3

iii) 1 kL = 1000 L

= 1 m^3 (1000 L = 1 m^3)

iv) Volume of a cube of side 8 cm = $side^3$ = 8^3 = 512 cm^3

v) Length of the wooden cuboid = 10 cm

Breadth = 8 cm

Its volume = 4000 cm^3

Suppose that the height of the cuboid is h cm

Then, Volume of the cuboid = length x breadth x height

4000 = 10 x 8 x h

4000 = 80 x h

h = $\frac{4000}{80}$ = 50 cm

vi) 1 cu dm = 1 dm x 1 dm x 1 dm

= 100 mm x 100 mm x 100 mm

= 1000000 mm^3 = 10^6 cu mm

vii) 1 cu km = 1 km x 1 km x 1 km

= 1000 m x 1000 m x 1000 m (because 1 km = 1000 m) = 10^9 m^3