

ICSE Class 8 Maths Selina Solutions Chapter 21: ICSE Class 8 Maths Selina Solutions for Chapter 21, "Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder)," help students learn about measuring these 3D shapes.

The solutions provide easy-to-understand steps and examples, making it simple for students to solve these problems. Practicing with these solutions helps students improve their math skills and prepares them for exams and everyday situations involving these shapes.

ICSE Class 8 Maths Selina Solutions Chapter 21 Overview

ICSE Class 8 Maths Selina Solutions for Chapter 21, "Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder)," are prepared by subject experts from Physics Wallah. These solutions provide a clear and concise overview of how to calculate the surface area and volume of cuboids, cubes, and cylinders.

By breaking down complex problems into easy-to-understand steps, the experts ensure that students can grasp these important mathematical concepts with ease. These solutions are designed to help students enhance their problem-solving skills and excel in their studies.

Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder)

Surface Area, Volume, and Capacity refer to measurements related to three-dimensional shapes such as cuboids, cubes, and cylinders.

Surface Area:

- **Cuboid:** The surface area of a cuboid is the total area of all its six rectangular faces.
- **Cube:** A cube has all sides equal.
- **Cylinder:** The surface area of a cylinder includes the areas of its two circular bases and the rectangular wrap around it (lateral surface area).

Capacity:

- Capacity refers to the volume of the shape, especially when considering how much liquid it can hold. For a cuboid, cube, and cylinder, capacity is equivalent to their respective volumes.

ICSE Class 8 Maths Selina Solutions Chapter 21 PDF

The PDF link for ICSE Class 8 Maths Selina Solutions Chapter 21, "Surface Area, Volume, and Capacity (Cuboid, Cube, and Cylinder)," is available below.

By accessing the PDF, students can enhance their understanding of how to calculate surface area and volume for various 3D shapes, improving their problem-solving skills and preparing effectively for exams.

ICSE Class 8 Maths Selina Solutions Chapter 21 PDF

ICSE Class 8 Maths Selina Solutions Chapter 21 Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder)

Below we have provided ICSE Class 8 Maths Selina Solutions Chapter 21 Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder) for the ease of the students –

ICSE Class 8 Maths Selina Solutions Chapter 21 Surface Area, Volume and Capacity (Cuboid, Cube and Cylinder)

Question 1.

Find the volume and the total surface area of a cuboid, whose:

(i) Length = 15cm, breadth = 10cm and height = 8cm.

Solution:-

We know that

$$\text{Volume of a cuboid} = \text{Length} \times \text{Breadth} \times \text{Height} = 15 \times 10 \times 8 = 1200\text{cm}^3$$

Here

$$\text{Total surface area of a cuboid} = 2(l \times b + b \times h + h \times l) = 2(15 \times 10 + 10 \times 8 + 8 \times 15)$$

By further calculation

$$= 2(150 + 80 + 120) = 2 \times 350 = 700\text{cm}^2$$

(ii) l = 3.5m, b = 2.6m and h = 90cm,

Solution:-

Length = 3.5m breadth = 2.6m, height = 90cm = $\frac{90}{100}m = 0.9m$.

We know that

$$\text{Volume of a cuboid} = l \times b \times h = 3.5 \times 2.6 \times 0.9 = 8.19m^3$$

Here

$$\text{Total surface area of a cuboid} = 2(l \times b + b \times h + h \times l) = 2(3.5 \times 2.6 + 2.6 \times 0.9 + 3.5 \times 0.9)$$

By further calculation

$$= 2(9.10 + 2.34 + 3.15) = 2(14.59) = 29.18m^2$$

Question 2.

(i) The volume of a cuboid is 3456 cm^3 . If its length = 24 cm and breadth = 18 cm; find its height.

Solution:

$$\text{Volume of the given cuboid} = 3456 \text{ cm}^3.$$

Length of the given cuboid = 24 cm

Breadth of the given cuboid = 18 cm

Here

Length \times Breadth \times Height = Volume of a cuboid

Substituting the values

$$24 \times 18 \times \text{Height} = 3456$$

By further calculation

$$\text{Height} = \frac{3456}{24 \times 18}$$

So we get

$$\text{Height} = \frac{3456}{432}$$

$$\text{Height} = 8 \text{ cm}$$

(ii) The volume of a cuboid is 7.68 m^3 . If its length = 3.2m and height = 1.0m; find its breadth.

Solution:-

$$\text{Volume of a cuboid} = 7.68 \text{ m}^3$$

$$\text{Length of a cuboid} = 3.2 \text{ m}$$

Height of a cuboid =1.0 m

Here

Length x Breadth x Height = Volume of a cuboid

Substituting the values

$$3.2 \times \text{Breadth} \times 1.0 = 7.68$$

By further calculation

$$\Rightarrow \text{Breadth} = \frac{7.68}{3.2 \times 1.0}$$

So we get

$$\Rightarrow \text{Breadth} = \frac{7.68}{3.2}$$

$$\Rightarrow \text{Breadth} = 2.4 \text{ m}$$

(iii) The breadth and height of a rectangular solid are 1.20 m and 80 cm respectively. If the volume of the cuboid is 1.92 m^3 ; find its length.

Solution:-

Volume of a rectangular solid = 1.92 m^3

Breadth of a rectangular solid = 1.20 m

Height of a rectangular solid = 80 cm = 0.8 m

Here

Length x Breadth x Height = Volume of a rectangular solid (cubical)

Substituting the values

$$\text{Length} \times 1.20 \times 0.8 = 1.92$$

By further calculation

$$\text{Length} \times 0.96 = 1.92$$

$$= \frac{1.92}{0.96}$$

So we get

$$= \frac{192}{96}$$

Length = 2 m

Question 3.

The length, breadth and height of a cuboid are in the ratio 5:3:2. If its volume is 240cm^3 , find its dimensions. (Dimensions means: its length, breadth and height). Also find the total surface area of the cuboid.

Solution:-

Consider length of the given cuboid = $5x$

Breadth of the given cuboid = $3x$

Height of the given cuboid = $2x$

We know that

Volume of the given cuboid = Length \times Breadth \times height

Substituting the values

$$= 5x \times 3x \times 2x = 30x^3$$

It is given that

$$\text{Volume} = 240\text{cm}^3$$

Substituting the values

$$30x^3 = 240\text{cm}^3$$

By further calculation

$$x^3 = \frac{240}{30} \quad x^3 = 8$$

So we get

$$x = 8^{\frac{1}{3}} \quad x = (2 \times 2 \times 2)^{\frac{1}{3}}$$

$x = 2 \text{ cm}$

Here

Length of the given cube $= 5x = 5 \times 2 = 10 \text{ cm}$

Breadth of the given cube $= 3x = 3 \times 2 = 6 \text{ cm}$

Height of the given cube $= 2x = 2 \times 2 = 4 \text{ cm}$

We know that

Total surface area of the given cuboid $= 2(l \times b + b \times h + h \times l)$

Substituting the values

$$= 2(10 \times 6 + 6 \times 4 + 4 \times 10) = 2(60 + 24 + 40) = 2 \times 124 = 248 \text{ cm}^2$$

Question 4.

The length, breadth and height of a cuboid are in the ratio 6:5:3. If its total surface area is 504 cm^2 ; find its dimensions. Also, find the volume of the cuboid.

Solution:-

Consider length of the cuboid $= 6x$

Breadth of the cuboid $= 5x$

Height of the cuboid $= 3x$

We know that

Total surface area of the given cuboid $= 2(l \times b + b \times h + h \times l)$

Substituting the values

$$= 2(6x \times 5x + 5x \times 3x + 3x \times 6x) = 2(30 \times 2 + 15 \times 2 + 18 \times 2)$$

We get

$$= 2 \times 63 \times 2 = 126x^2$$

It is given that

$$\text{Total surface area of the given cuboid} = 504\text{cm}^2$$

Substituting the values

$$126x^2 = 504\text{cm}^2$$

By further calculation

$$\Rightarrow x^2 = \frac{504}{126}$$

So we get

$$\Rightarrow x^2 = 4 \Rightarrow x = \sqrt{4}$$

$$x = 2 \text{ cm}$$

Here

$$\text{Length of the cuboid} = 6x = 6 \times 2 = 12\text{cm}$$

$$\text{Breadth of the cuboid} = 5x = 5 \times 2 = 10\text{cm}$$

$$\text{Height of the cuboid} = 3x = 3 \times 2 = 6\text{cm}$$

We get

$$\text{Volume of the cuboid} = l \times b \times h = 12 \times 10 \times 6 = 720\text{cm}^3$$

Question 5.

Find the volume and total surface area of a cube whose edge is:

(i) 8 cm

Solution:-

$$\text{Edge of the given cube} = 8\text{cm}$$

We know that

$$\text{Volume of the given cube} = (\text{Edge})^3 = (8)^3 = 8 \times 8 \times 8 = 512\text{cm}^3$$

$$\text{Total surface area of a cube} = 6(\text{Edge})^2 = 6 \times (8)^2 = 384\text{cm}^2$$

(ii) 2m 40 cm.

Solution:-

(ii) Edge of the given cube = 2 m 40 cm = 2.40 m

We know that

$$\text{Volume of a cube} = (\text{Edge})^3$$

Substituting the values

$$\text{Volume of the given cube} = (2.40)^3 = 2.40 \times 2.40 \times 2.40 = 13.824\text{m}^3$$

$$\text{Total surface area of the given cube} = 6 \times 2.4 \times 2.4 = 34.56\text{m}^2$$

Question 6.

Find the length of each edge of a cube, if its volume is:

(i) 216cm^3

Solution:-

$$(\text{Edge})^3 = \text{Volume of a cube}$$

Substituting the values

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

It can be written as

$$\text{Edge} = (216)^{1/3}$$

$$\text{Edge} = (3 \times 3 \times 3 \times 2 \times 2 \times 2)^{1/3}$$

We get

$$\text{Edge} = 3 \times 2$$

Ans. Edge = 6 cm.

$$(ii) 1.728\text{m}^3$$

Solution:-

$$(\text{Edge})^3 = \text{Volume of a cube}$$

Substituting the values

$$(\text{Edge})^3 = 1.728\text{m}^3 \Rightarrow (\text{Edge})^3 = \frac{1.728}{1000} = \frac{1728}{1000}$$

It can be written as

$$\text{Edge} = \left(\frac{1728}{1000}\right)^{1/3}$$

By further calculation

$$\text{Edge} = \left(\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}{10 \times 10 \times 10}\right)^{1/3} \text{Edge} = \frac{2 \times 2 \times 3}{10}$$

So we get

$$\text{Edge} = \frac{12}{10}\text{m}$$

Edge = 1.2 m.

Question 7.

The total surface area of a cube is 216 cm^2 . Find its volume.

Solution:-

$$6(\text{Edge})^2 = \text{Total surface area of a cube}$$

Substituting the values

$$6(\text{Edge})^2 = 216\text{cm}^2 \quad (\text{Edge})^2 = \frac{216}{6}$$

By further calculation

$$(\text{Edge})^2 = 36$$

$$\text{Edge} = \sqrt{36}$$

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

We know that

$$\text{Volume of the given cube} = (\text{Edge})^3 = (6)^3 = 6 \times 6 \times 6 = 216\text{cm}^3$$

Question 8.

A solid cuboid of metal has dimensions 24 cm, 18 cm and 4 cm. Find its volume.

Solution:-

It is given that

Length of the cuboid = 24 cm

Breadth of the cuboid = 18 cm

Height of the cuboid = 4 cm

We know that

$$\text{Volume of the cuboid} = l \times b \times h = 24 \times 18 \times 4 = 1728\text{cm}^3$$

Question 9.

A wall 9 m long, 6 m high and 20 cm thick, is to be constructed using bricks of dimensions 30 cm, 15 cm and 10 cm. How many bricks will be required?

Solution:

It is given that

Length of the wall = 9m = 9 × 100cm = 900cm

Height of the wall = 6m = 6 × 100cm = 600cm

Breadth of the wall = 20 cm

We know that

$$\text{Volume of the wall} = 900 \times 600 \times 20\text{cm}^3 = 10800000\text{cm}^3$$

$$\text{Volume of one Brick} = 30 \times 15 \times 10\text{cm}^3 = 4500\text{cm}^3$$

So we get

$$\begin{aligned}\text{Number of bricks required to construct the wall} &= \frac{\text{Volume of wall}}{\text{Volume of one brick}} = \frac{10800000}{4500} \\ &= 2400\end{aligned}$$

Question 10.

A solid cube of edge 14 cm is melted down and recasted into smaller and equal cubes each of edge 2 cm; find the number of smaller cubes obtained.

Solution:-

We know that

Edge of the big solid cube = 14 cm

$$\text{Volume of the big solid cube} = 14 \times 14 \times 14\text{cm}^3 = 2744\text{cm}^3$$

Similarly

Edge of the small cube = 2 cm

$$\text{Volume of one small cube} = 2 \times 2 \times 2\text{cm}^3 = 8\text{cm}^3$$

So we get

$$\text{Number of smaller cubes obtained} = \frac{\text{Volume of big cube}}{\text{Volume of one small cube}} = \frac{2744}{8} = 343$$

Question 11.

A closed box is cuboid in shape with length =40cm, breadth =30cm and height =50cm. It is made of thin metal sheet. Find the cost of metal sheet required to make 20 such boxes, if 1 m² of metal sheet costs Rs. 45.

Solution:-

It is given that

Length of closed box (l) =40cm

Breadth (b) =30cm

And height (h) =50cm

We know that

Total surface area =2(l×b+b×h+h×l)

Substituting the values

$$= 2(40 \times 30 + 30 \times 50 + 50 \times 40)\text{cm}^2$$

By further calculation

$$= 2(1200 + 1500 + 2000)\text{cm}^2$$

So we get

$$= 2 \times 4700 = 9400\text{cm}^2$$

Here

$$\text{Surface area of sheet used for 20 such boxes} = 9400 \times 20 = 188000\text{cm}^2 = 18.8\text{m}^2$$

$$\text{Cost of } 1\text{m}^2 \text{ sheet} = \text{Rs.}45$$

We get

$$\text{Total cost} = 18.8 \times 45 = \text{Rs.}846$$

Question 12.

Four cubes, each of edge 9 cm, are joined as shown below:

Write the dimensions of the resulting cuboid obtained. Also, find the total surface area and the volume of the resulting cuboid.

Solution:-

Edge of each cube =9cm

(i) We know that

Length of the cuboid formed by 4 cubes (1) =9×4=36cm

Breadth (b) =9cm and height (h) = 9cm

(ii) Total surface area of the cuboid = 2(lb + bh + hl)

Substituting the values

$$= 2(36 \times 9 + 9 \times 9 + 9 \times 36)\text{cm}^2$$

By further calculation

$$= 2(324 + 81 + 324)\text{cm}^2$$

So we get

$$= 2 \times 729\text{cm}^2 = 1458\text{cm}^2$$

$$\text{(iii) Volume} = l \times b \times h = 36 \times 9 \times 9\text{cm}^3 = 2916\text{cm}^3$$

Question 13.

How many persons can be accommodated in a big-hall of dimensions 40 m, 25m and 15m; assuming that each person requires 5m³ of air?

Solution:-

$$\text{No. of persons} = \frac{\text{Vol. of the hall}}{\text{Vol. of air required for each person}}$$

It is given that

Length of the hall = 40m

Breadth = 25m

Height = 15m

Here

$$\text{Volume of the hall} = l \times b \times h = 40 \times 25 \times 15 = 15000\text{m}^3$$

$$\text{Volume of the air required for each person} = 5\text{m}^3$$

So we get

$$\text{No. of persons who can be accommodated} = \frac{\text{Volume of the hall}}{\text{Volume of air required for each person}} = \frac{15000\text{m}^3}{5\text{m}^3} = 3000$$

Question 14.

The dimension of a class-room are; length = 15m, breadth = 12m and height = 7.5m. Find, how many children can be accommodated in this class-room; assuming 3.6 m³ of air is needed for each child.

Solution:-

It is given that

Length of the room = 15m

Breadth of the room = 12m

Height of the room = 7.5m

We know that

$$\text{Volume of the room} = L \times B \times H = 15 \times 12 \times 7.5\text{m}^3 = 1350\text{m}^3$$

$$\text{Volume of air required for each child} = 3.6\text{m}^3$$

So we get

$$\begin{aligned} \text{No. of children who can be accommodated in the class room.} &= \frac{\text{Volume of class room}}{\text{Volume of air needed for each child}} = \frac{1350\text{m}^3}{3.6\text{m}^3} \\ &= 375. \end{aligned}$$

Question 15.

The length, breadth and height of a room are 6m, 5.4m and 4 m respectively. Find the area of:

(i) Its four-walls

(ii) Its roof.

Solution:-

It is given that

Length of the room = 6m

Breadth of the room = 5.4m

Height of the room = 4m

$$(i) \text{ Area of four walls} = 2(L + B) \times H = 2(6 + 5.4) \times 4 = 2 \times 11.4 \times 4 = 91.2\text{m}^2$$

$$(ii) \text{ Area of the roof} = L \times B = 6 \times 5.4 = 32.4\text{m}^2$$

Benefits of ICSE Class 8 Maths Selina Solutions Chapter 21

- **Clear Explanations:** These solutions provide detailed and easy-to-understand explanations, helping students grasp complex concepts related to surface area, volume, and capacity.
- **Step-by-Step Solutions:** Each problem is solved step-by-step, allowing students to follow the logical progression of solving mathematical problems.
- **Improved Problem-Solving Skills:** By practicing these solutions students can enhance their problem-solving abilities and become more confident in handling similar problems in exams.
- **Exam Preparation:** The solutions are aligned with the ICSE curriculum, making them a valuable resource for exam preparation. They help students understand the types of questions that may appear in exams and how to approach them.
- **Comprehensive Coverage:** The solutions cover all aspects of the chapter, ensuring that students get a thorough understanding of calculating surface area and volume for cuboids, cubes, and cylinders.
- **Practical Applications:** Understanding these concepts helps students apply mathematical principles to real-life situations, such as measuring spaces and volumes in everyday contexts.