

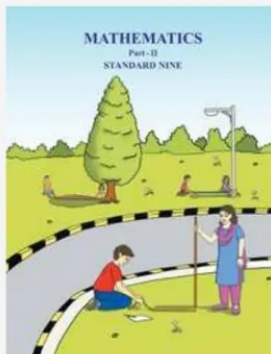
Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 9.2- Surface Area and Volume

BOOK SOLUTIONS
CLASS 9
MATHS (PART 2)

CHAPTER 9.2
Surface Area and Volume

Maharashtra Board Solutions→



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Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 9.2- Surface Area and Volume

Class 9: Maths Chapter 9.2 solutions. Complete Class 9 Maths Chapter 9.2 Notes.

Maharashtra Board Solutions Class 9-Maths (Part 2): Chapter 9.2- Surface Area and Volume

Maharashtra Board 9th Maths Chapter 9.2, Class 9 Maths Chapter 9.2 solutions

Question 1.

Perpendicular height of a cone is 12 cm and its slant height is 13 cm. Find the radius of the base of the cone.

Given: Height (h) = 12 cm, length (l) = 13 cm

To find: Radius of the base of the cone (r)

Solution:

$$l^2 = r^2 + h^2$$

$$\therefore 13^2 = r^2 + 12^2$$

$$\therefore 169 = r^2 + 144$$

$$\therefore 169 - 144 = r^2$$

$$\therefore r^2 = 25$$

$$\therefore r = \sqrt{25} \dots [\text{Taking square root on both sides}]$$

$$= 5 \text{ cm}$$

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∴ The radius of base of the cone is 5 cm.

Question 2.

Find the volume of a cone, if its total surface area is 7128 sq.cm and radius of base is 28 cm. ($\pi = 22/7$)

Given: Radius (r) = 28 cm,

Total surface area of cone = 7128 sq.cm

To find: Volume of the cone

Solution:

i. Total surface area of cone = $\pi r (l + r)$

$$\therefore 7128 = \pi \times 28 \times (l + 28)$$

$$\therefore 7128 = 22 \times 4 \times (l + 28)$$

$$\therefore l + 28 = 7128 / 22 \times 4$$

$$\therefore l + 28 = 81$$

$$\therefore l = 81 - 28$$

$$\therefore l = 53 \text{ cm}$$

ii. Now, $l^2 = r^2 + h^2$

$$\therefore 53^2 = 28^2 + h^2$$

$$\therefore 2809 = 784 + h^2$$

$$\therefore 2809 - 784 = h^2$$

$$\therefore h^2 = 2025$$

$$\therefore h = \sqrt{2025} \dots\dots \text{[Taking square root on both sides]}$$

$$= 45 \text{ cm}$$

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$$\begin{aligned}\therefore \text{Volume of cone} &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \times \frac{22}{7} \times 28^2 \times 45 \\ &= \frac{1}{3} \times \frac{22}{7} \times 28 \times 28 \times 45\end{aligned}$$

$$= 22 \times 4 \times 28 \times 15$$

$$= 36960 \text{ cubic.cm}$$

$\therefore$ The volume of the cone is 36960 cubic.cm.

Question 3.

Curved surface area of a cone is 251.2 cm^2 and radius of its base is 8 cm. Find its slant height and perpendicular height, ($\pi = 3.14$)

Given: Radius (r) = 8 cm, curved surface area

of cone = 251.2 cm^2

To find: Slant height (l) and the perpendicular height (h) of the cone

Solution:

i. Curved surface area of cone = $\pi r l$

$$\therefore 251.2 = 3.14 \times 8 \times l$$

$$\begin{aligned}\therefore l &= \frac{251.2}{3.14 \times 8} \\ &= \frac{25120}{314 \times 8} \\ &= \frac{3140}{314}\end{aligned}$$

$$\therefore l = 10 \text{ cm}$$

ii. Now, $l^2 = r^2 + h^2$

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$$\therefore 10^2 = 8^2 + h^2$$

$$\therefore 100 = 64 + h^2$$

$$\therefore 100 - 64 = h^2$$

$$\therefore h^2 = 36$$

$$\therefore h = \sqrt{36} \dots \text{[Taking square root on both sides]}$$

$$= 6 \text{ cm}$$

$\therefore$ The slant height and the perpendicular height of the cone are 10 cm and 6 cm respectively.

Question 4.

What will be the cost of making a closed cone of tin sheet having radius of base 6 m and slant height 8 m if the rate of making is ₹ 10 per sq.m?

Given: Radius (r) = 6 m, length (l) = 8 m

To find: Total cost of making the cone

Solution:

i. To find the total cost of making the cone of tin sheet, first we need to find the total surface area of the cone.

$$\text{Total surface area of the cone} = \pi r (l + r)$$

$$= 227 \times 6 \times (8 + 6)$$

$$= 227 \times 6 \times 14$$

$$= 22 \times 6 \times 2 = 264 \text{ sq.m}$$

ii. Rate of making the cone = ₹ 10 per sq.m

$$\therefore \text{Total cost} = \text{Total surface area} \times \text{Rate of making the cone}$$

$$= 264 \times 10$$

$$= ₹ 2640$$

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∴ A The total cost of making the cone of tin sheet is ₹ 2640.

Question 5.

Volume of a cone is 6280 cubic cm and base radius of the cone is 20 cm. Find its perpendicular height, ($\pi = 3.14$)

Given: Radius (r) = 20 cm,

Volume of cone = 6280 cubic cm

To find: Perpendicular height (h) of the cone

Solution:

$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$\therefore 6280 = \frac{1}{3} \times 3.14 \times 20^2 \times h$$

$$\begin{aligned}\therefore h &= \frac{6280 \times 3}{3.14 \times 400} \\ &= \frac{6280 \times 3}{314 \times 4} \\ &= \frac{20 \times 3}{4} = 15 \text{ cm}\end{aligned}$$

∴ The perpendicular height of the cone is 15 cm.

Question 6.

Surface area of a cone is 188.4 sq.cm and its slant height is 10 cm. Find its perpendicular height ($\pi = 3.14$).

Given: Length (l) = 10 cm, curved surface area of the cone = 188.4 sq.cm

To find: Perpendicular height (h) of the cone

Solution:

i. Curved surface area of the cone = $\pi r l$

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$$\therefore 188.4 = 3.14 \times r \times 10$$

$$\begin{aligned}\therefore r &= \frac{188.4}{3.14 \times 10} \\ &= \frac{188.4}{31.4} \\ &= \frac{1884}{314} \\ &= 6 \text{ cm}\end{aligned}$$

ii. Now, $l^2 = r^2 + h^2$

$$\therefore 10^2 = 6^2 + h^2$$

$$\therefore 100 = 36 + h^2$$

$$\therefore 100 - 36 = h^2$$

$$\therefore h^2 = 64$$

$$\therefore h = \sqrt{64} \dots \text{[Taking square root on both sides]}$$

$$= 8 \text{ cm}$$

$\therefore$ The perpendicular height of the cone is 8 cm.

Question 7.

Volume of a cone is 1232 cm^3 and its height is 24 cm. Find the surface area of the cone. ($\pi = 22/7$)

Given: Height (h) = 24 cm,

Volume of cone = 1232 cm^3

To find: Surface area of the cone

Solution:

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i. Volume of cone = $\frac{1}{3} \pi r^2 h$

$$\therefore 1232 = \frac{1}{3} \times \frac{22}{7} \times r^2 \times 24$$

$$\begin{aligned}\therefore r^2 &= \frac{1232 \times 3 \times 7}{22 \times 24} \\ &= \frac{56 \times 1 \times 7}{1 \times 8}\end{aligned}$$

$$\therefore r^2 = 49$$

$$\therefore r = \sqrt{49} \dots \text{[Taking square root on both sides]}$$

$$= 7 \text{ cm}$$

ii. Now, $l^2 = r^2 + h^2$

$$\therefore l^2 = 7^2 + 24^2$$

$$= 49 + 576 = 625$$

$$\therefore l = \sqrt{625} \dots \text{[Taking square root on both sides]}$$

$$= 25$$

iii. Curved surface area of cone = $\pi r l$

$$= 227 \times 7 \times 25$$

$$= 22 \times 25$$

$$= 550 \text{ sq.cm}$$

$\therefore$ The surface area of the cone is 550 sq.cm.

Question 8.

The curved surface area of a cone is 2200 sq.cm and its slant height is 50 cm. Find the total surface area of cone. ($\pi = 227$)

Given: Length (l) = 50 cm, curved surface area of cone = 2200 sq.cm

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To find: Total surface area of the cone

Solution:

i. Curved surface area of cone = πrl

$$\therefore 2200 = \frac{22}{7} \times r \times 50$$

$$\begin{aligned}\therefore r &= \frac{2200 \times 7}{22 \times 50} \\ &= \frac{100 \times 7}{50} = 14 \text{ cm}\end{aligned}$$

ii. Total surface area of cone = $\pi r(l + r)$

$$= 227 \times 14 \times (50 + 14)$$

$$= 227 \times 14 \times 64$$

$$= 22 \times 2 \times 64$$

$$= 2816 \text{ sq.cm}$$

$\therefore$ The total surface area of the cone is 2816 sq.cm.

Question 9.

There are 25 persons in a tent which is conical in shape. Every person needs an area of 4 sq.m, of the ground inside the tent. If height of the tent is 18 m, find the volume of the tent.

Given: For the tent,

height (h) = 18m,

number of people in the tent = 25,

area required for each person = 4 sq.m

To find: Volume of the tent

Solution:

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i. Every person needs an area of 4 sq.m, of the ground inside the tent.

Surface area of the base of the tent = number of people in the tent $\times$ area required for each person

$$= 25 \times 4$$

$$= 100 \text{ sq.m}$$

ii. Surface area of the base of the tent = πr^2

$$\therefore 100 = \pi r^2$$

$$\therefore \pi r^2 = 100$$

iii. Volume of the tent = $13 \pi r^2 h$

$$= 13 \times 100 \times 18 \dots\dots[\because \pi r^2 = 100]$$

$$= 100 \times 6$$

$$= 600 \text{ cubic metre}$$

$\therefore$ The volume of the tent is 600 cubic metre.

Question 10.

In a field, dry fodder for the cattle is heaped in a conical shape. The height of the cone is 2.1 m and diameter of base is 7.2 m. Find the volume of the heap of the fodder. If it is to be covered by polythene in rainy season then how much minimum polythene

sheet is needed? ($\pi = 227$ and $17.37 \text{-----}\sqrt{} = 4.17$)

Given: Height of the heap (h) = 2.1 m.

diameter of the base (d) = 7.2 m

$\therefore$ Radius of the base (r) = $d/2 = 7.2/2 = 3.6$ m

To find: Volume of the heap of the fodder and polythene sheet required

Solution:

i. Volume of the heap of fodder = $13\pi r^2 h$

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$$= 13 \times 227 \times (3.6)^2 \times 2.1$$

$$= 13 \times 227 \times 3.6 \times 3.6 \times 2.1$$

$$= 1 \times 22 \times 1.2 \times 3.6 \times 0.3$$

$$= 28.51 \text{ cubic metre}$$

ii. Now, $l^2 = r^2 + h^2$

$$= (3.6)^2 + (2.1)^2$$

$$= 12.96 + 4.41$$

$$\therefore l^2 = 17.37$$

$$\therefore l = \sqrt{17.37} \dots \text{[Taking square root on both sides]}$$

$$= 4.17 \text{ m}$$

iii. Area of the polythene sheet needed to cover the heap of the fodder = Curved surface area of the conical heap

$$= \pi rl$$

$$= 227 \times 3.6 \times 4.17$$

$$= 47.18 \text{ sq.m}$$

$\therefore$ The volume of the heap of the fodder is 28.51 cubic metre and a polythene sheet of 47.18 sq.m will be required to cover it.



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Class 9 Maths

Part 2

- Chapter 1.1- Basic Concepts in Geometry
- Chapter 1.2- Basic Concepts in Geometry
- Chapter 1.3- Basic Concepts in Geometry
- Chapter 2.1- Parallel Lines
- Chapter 2.2- Parallel Lines
- Chapter 3.1- Triangles
- Chapter 3.2- Triangles
- Chapter 3.3- Triangles
- Chapter 3.4- Triangles
- Chapter 3.5- Triangles
- Chapter 4.1- Constructions of Triangles
- Chapter 4.2- Constructions of Triangles
- Chapter 4.3- Constructions of Triangles
- Chapter 5.1- Quadrilaterals
- Chapter 5.2- Quadrilaterals
- Chapter 5.3- Quadrilaterals
- Chapter 5.4- Quadrilaterals
- Chapter 5.5- Quadrilaterals
- Chapter 6.1- Circle
- Chapter 6.2- Circle
- Chapter 6.3- Circle
- Chapter 7.1- Co-ordinate Geometry
- Chapter 7.2- Co-ordinate Geometry
- Chapter 8.1- Trigonometry
- Chapter 8.2- Trigonometry
- Chapter 9.1- Surface Area and Volume
- Chapter 9.2- Surface Area and Volume
- Chapter 9.3- Surface Area and Volume

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The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

The Maharashtra government established the Maharashtra State Bureau of Textbook Production and Curriculum Research, also commonly referred to as Ebalbharati, in 1967 to take up the responsibility of providing quality textbooks to students from all classes studying under the Maharashtra State Board. MSBHSE prepares and updates the curriculum to provide holistic development for students. It is designed to tackle the difficulty in understanding the concepts with simple language with simple illustrations. Every year around 10 lakh students are enrolled in schools that are affiliated with the Maharashtra State Board.

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