

Solutions for Class 9 Maths Chapter 21 Surface Area and Volume of A Sphere

Exercise 21.1

Question 1: Find the surface area of a sphere of radius:

(i) 10.5 cm (ii) 5.6 cm (iii) 14 cm

Solution:

Surface area of a sphere = $4\pi r^2$

Where, r = radius of a sphere

(i) Radius = 10.5 cm

Surface area = $4 \times \frac{22}{7} \times (10.5)^2$

= 1386

Surface area is 1386 cm²

(ii) Radius= 5.6 cm

Surface area = $4 \times \frac{22}{7} \times (5.6)^2$

= 394.24

Surface area is 394.24 cm²

(iii) Radius = 14 cm

Surface area = $4 \times \frac{22}{7} \times (14)^2$

= 2464

Surface area is 2464 cm²

Question 2: Find the surface area of a sphere of diameter:

(i) 14 cm (ii) 21 cm (iii) 3.5 cm

Solution:

Surface area of a sphere = $4\pi r^2$

Where, r = radius of a sphere

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(i) Diameter= 14 cm

So, Radius = Diameter/2 = 14/2 cm = 7 cm

$$\text{Surface area} = 4 \times \frac{22}{7} \times (7)^2$$

$$= 616$$

Surface area is 616 cm²

(ii) Diameter = 21cm

So, Radius = Diameter/2 = 21/2 cm = 10.5 cm

$$\text{Surface area} = 4 \times \frac{22}{7} \times (10.5)^2$$

$$= 1386$$

Surface area is 1386 cm²

(iii) Diameter= 3.5cm

So, Radius = Diameter/2 = 3.5/2 cm = 1.75 cm

$$\text{Surface area} = 4 \times \frac{22}{7} \times (1.75)^2$$

$$= 38.5$$

Surface area is 38.5 cm²

Question 3: Find the total surface area of a hemisphere and a solid hemisphere each of radius 10 cm. ($\pi=3.14$)

Solution:

Radius of a hemisphere = Radius of a solid hemisphere = 10 cm (Given)

$$\text{Surface area of the hemisphere} = 2\pi r^2$$

$$= 2 \times 3.14 \times (10)^2 \text{ cm}^2$$

$$= 628 \text{ cm}^2$$

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And, surface area of solid hemisphere = $3\pi r^2$

$$= 3 \times 3.14 \times (10)^2 \text{ cm}^2$$

$$= 942 \text{ cm}^2$$

Question 4: The surface area of a sphere is 5544 cm^2 , find its diameter.

Solution:

Surface area of a sphere is 5544 cm^2

Surface area of a sphere = $4\pi r^2$

$$\text{So, } 4\pi r^2 = 5544$$

$$4 \times \frac{22}{7} \times (r)^2 = 5544$$

$$r^2 = (5544 \times 7) / 88$$

$$r^2 = 441$$

$$\text{or } r = 21 \text{ cm}$$

$$\text{Now, Diameter} = 2(\text{radius}) = 2(21) = 42 \text{ cm}$$

Question 5: A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin plating it on the inside at the rate of Rs.4 per 100 cm^2 .

Solution:

Inner diameter of hemispherical bowl = 10.5 cm

$$\text{So, radius} = \text{Diameter} / 2 = 10.5 / 2 \text{ cm} = 5.25 \text{ cm}$$

Now, Surface area of hemispherical bowl = $2\pi r^2$

$$= 2 \times 3.14 \times (5.25)^2$$

$$= 173.25$$

So, Surface area of hemispherical bowl is 173.25 cm^2

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Find the cost:

Cost of tin plating 100 cm^2 area = Rs.4 (given)

Cost of tin plating 173.25 cm^2 area = Rs. $4 \times 173.25 / 100 = \text{Rs. } 6.93$

Therefore, cost of tin plating the inner side of hemispherical bowl is Rs.6.93. Answer!!

Question 6: The dome of a building is in the form of a hemisphere. Its radius is 63 dm. Find the cost of painting it at the rate of Rs. 2 per sq m.

Solution:

Radius of hemispherical dome = 63 dm or 6.3 m

Inner surface area of dome = $2\pi r^2$

$$= 2 \times 3.14 \times (6.3)^2$$

$$= 249.48$$

So, Inner surface area of dome is 249.48 m^2

Now find the cost:

Cost of painting $1 \text{ m}^2 = \text{Rs. } 2$ (given)

Therefore, cost of painting $249.48 \text{ m}^2 = \text{Rs. } (249.48 \times 2) = \text{Rs. } 498.96$.