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Practice Set 9.1 Geometry 9th Std Maths Part 2 Answers Chapter 9 Surface Area and Volume

Question 1.
Length, breadth and height of a cuboid shape box of medicine is 20 cm, 12 cm and 10 cm respectively. Find the surface area of vertical faces and total surface area of this box.
Given: For cuboid shape box of medicine,
length (l) = 20 cm, breadth (b) = 12 cm and height (h) = 10 cm.
To find: Surface area of vertical faces and total surface area of the box
Solution:
i. Surface area of vertical faces of the box
= 2(l + b) x h
= 2(20+ 12) x 10
= 2 x 32 x 10
= 640 sq.cm.

ii. Total surface area of the box
= 2 (lb + bh + lh)
= 2(20 x 12+ 12 x 10 + 20 x 10)
= 2(240 + 120 + 200)
= 2 x 560
= 1120 sq.cm.
∴ The surface area of vertical faces and total surface area of the box are 640 sq.cm, and 1120 sq.cm, respectively.

Question 2.
Total surface area of a box of cuboid shape is 500 sq.unit. Its breadth and height is 6 unit and 5 unit respectively. What is the length of that box?
Given: For cuboid shape box,
breadth (b) = 6 unit, height (h) = 5 unit Total surface area = 500 sq. unit.
To find: Length of the box (l)
Solution:
Total surface area of the box = 2 (lb + bh + lh)
∴ 500 = 2 (6l + 6 x 5 + 5l)

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∴ 5002 = (11l + 30)
∴ 250= 11l + 30
∴ 250 – 30= 11l
∴ 220 = 11l
∴ 220 = l
∴ 22011 = l
∴ l = 20 units
∴ The length of the box is 20 units.

Question 3.
Side of a cube is 4.5 cm. Find the surface area of all vertical faces and total surface area of the cube.
Given: Side of cube (l) = 4.5 cm
To find: Surface area of all vertical faces and the total surface area of the cube
Solution:
i. Area of vertical faces of cube = $4l^2$
= 4 $(4.5)^2$ = 4 x 20.25 = 81 sq.cm.
ii. Total surface area of the cube = $6l^2$
= 6 $(4.5)^2$
= 6 x 20.25
= 121.5 sq.cm.
∴ The surface area of all vertical faces and the total surface area of the cube are 81 sq.cm, and 121.5 sq.cm, respectively.

Question 4.
Total surface area of a cube is 5400 sq. cm. Find the surface area of all vertical faces of the cube.
Given: Total surface area of cube = 5400 sq.cm.
To find: Surface area of all vertical faces of the cube
Solution:
i. Total surface area of cube = $6l^2$
∴ 5400 = $6l^2$
∴ 54006 = l^2
∴ l^2 = 900
ii. Area of vertical faces of cube = $4l^2$
= 4 x 900 = 3600 sq.cm.
∴ The surface area of all vertical faces of the cube is 3600 sq.cm.

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Question 5.
Volume of a cuboid is 34.50 cubic metre. Breadth and height of the cuboid is 1.5 m and 1.15 m respectively. Find its length.
Given: Breadth (b) = 1.5 m, height (h) = 1.15 m
Volume of cuboid = 34.50 cubic metre
To find: Length of the cuboid (l)
Solution:
Volume of cuboid = l x b x h
∴ 34.50 = l x b x h
∴ 34.50 = l x 1.5 x 1.15

$$\therefore \quad l = \frac{34.50}{1.5 \times 1.15}$$

$$= \frac{34500}{15 \times 115}$$

$$= \frac{300}{15}$$

$$= 20$$

= 20
∴ The length of the cuboid is 20 m.

Question 6.
What will be the volume of a cube having length of edge 7.5 cm ?
Given: Length of edge of cube (l) = 7.5 cm
To find: Volume of a cube
Solution:
Volume of a cube = l^2
= $(7.5)^3$
= 421.875 ≈ 421.88 cubic cm
∴The volume of the cube is 421.88 cubic cm.

Question 7.
Radius of base of a cylinder is 20 cm and its height is 13 cm, find its curved surface area and total surface area, (π = 3.14)
Given: Radius (r) = 20 cm, height (h) = 13 cm
To find: Curved surface area and
the total surface area of the cylinder
Solution:
i. Curved surface area of cylinder = 2πrh

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= 2 x 3.14 x 20 x 13
= 1632.8 sq.cm

ii. Total surface area of cylinder = 2πr(r + h)
= 2 x 3.14 x 20(20 + 13)
= 2 x 3.14 x 20 x 33 = 4144.8 sq.cm
∴ The curved surface area and the total surface area of the cylinder are 1632.8 sq.cm and 4144.8 sq.cm respectively.

Question 8.
Curved surface area of a cylinder is 1980 cm^2 and radius of its base is 15 cm. Find the height of the cylinder. ($\pi = \frac{22}{7}$)
Given: Curved surface area of cylinder = 1980 sq.cm., radius (r) = 15 cm
To find: Height of the cylinder (h)
Solution:
Curved surface area of cylinder = 2πrh
∴ 1980 = 2 x $\frac{22}{7}$ x 15 x h
∴ $h = \frac{1980 \times 7}{2 \times 22 \times 15}$
∴ h = 21 cm
∴ The height of the cylinder is 21 cm.

Practice Set 9.2 Geometry 9th Std Maths Part 2 Answers Chapter 9 Surface Area and Volume

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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:
$l^2 = r^2 + h^2$
$\therefore 13^2 = r^2 + 12^2$
$\therefore 169 = r^2 + 144$
$\therefore 169 - 144 = r^2$
$\therefore r^2 = 25$
$\therefore r = \sqrt{25}$ ... [Taking square root on both sides]
= 5 cm
∴ 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. ($\pi = \frac{22}{7}$)
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 = $\pi r (l + r)$
$\therefore 7128 = y \times 28 \times (l + 28)$
$\therefore 7128 = 22 \times 4 \times (l + 28)$
$\therefore l + 28 = \frac{712822 \times 4}{}$
$\therefore l + 28 = 81$
$\therefore l = 81 - 28$
$\therefore l = 53cm$
ii. Now, $l^2 = r^2 + h^2$
$\therefore 53^2 = 28^2 + h^2$
$\therefore 2809 = 784 + h^2$
$\therefore 2809 - 784 = h^2$
$\therefore h^2 = 2025$
$\therefore h = \sqrt{2025}$ ..... [Taking square root on both sides]
= 45 cm

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

$$= \frac{1}{3} \times \frac{22}{7} \times 28^2 \times 45$$

$$= \frac{1}{3} \times \frac{22}{7} \times 28 \times 28 \times 45$$

= 22 x 4 x 28 x 15
= 36960 cubic.cm
∴ 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, (π = 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 = πrl
∴ 251.2 = 3.14 x 8 x l

$$\therefore \quad l = \frac{251.2}{3.14 \times 8}$$

$$= \frac{25120}{314 \times 8}$$

$$= \frac{3140}{314}$$

∴ l= 10 cm

ii. Now, $l^2 = r^2 + h^2$
∴ $10^2 = 8^2 + h^2$
∴ $100 = 64 + h^2$
∴ $100 – 64 = h^2$
∴ $h^2 = 36$
∴ h = √36 ... [Taking square root on both sides]
= 6 cm
∴ 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

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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.
Total surface area of the cone = πr (l + r)
= $\frac{22}{7}$ x 6 x (8 + 6)
= $\frac{22}{7}$ x 6 x 14
= 22 x 6 x 2 = 264 sq.m
ii. Rate of making the cone = ₹ 10 per sq.m
∴ Total cost = Total surface area x Rate of making the cone
= 264 x 10
= ₹ 2640
∴ 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, (π = 3.14)
Given: Radius (r) = 20 cm,
Volume of cone = 6280 cubic cm
To find: Perpendicular height (h) of the cone
Solution:

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

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

$$\therefore \quad h = \frac{6280 \times 3}{3.14 \times 400}$$

$$= \frac{6280 \times 3}{314 \times 4}$$

$$= \frac{20 \times 3}{4} = 15 \text{ cm}$$

∴ 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 (π = 3.14).

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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 = πrl
∴ 188.4 = 3.14 x r x 10

$$\therefore \quad r = \frac{188.4}{3.14 \times 10}$$
$$= \frac{188.4}{31.4}$$
$$= \frac{1884}{314}$$
$$= 6 \text{ cm}$$

ii. Now, $l^2 = r^2 + h^2$
∴ $10^2 = 6^2 + h^2$
∴ $100 = 36 + h^2$
∴ $100 - 36 = h^2$
∴ $h^2 = 64$
∴ h = $\sqrt{64}$ ... [Taking square root on both sides]
= 8 cm
∴ 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. ($\pi = \frac{22}{7}$)
Given: Height (h) = 24 cm,
Volume of cone = 1232 cm^3
To find: Surface area of the cone
Solution:

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

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

$$\therefore \quad r^2 = \frac{1232 \times 3 \times 7}{22 \times 24}$$
$$= \frac{56 \times 1 \times 7}{1 \times 8}$$

∴ $r^2 = 49$
∴ r = $\sqrt{49}$ ... [Taking square root on both sides]
= 7 cm

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

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

$= 49 + 576 = 625$

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

$= 25$

iii. Curved surface area of cone = πrl

$= \frac{22}{7} \times 7 \times 25$

$= 22 \times 25$

$= 550$ sq.cm

∴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. ($\pi = \frac{22}{7}$)

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

To find: Total surface area of the cone

Solution:

i. Curved surface area of cone = πrl

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

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

$$= \frac{100 \times 7}{50} = 14 \text{ cm}$$

ii. Total surface area of cone = πr (l + r)

$= \frac{22}{7} \times 14 \times (50 + 14)$

$= \frac{22}{7} \times 14 \times 64$

$= 22 \times 2 \times 64$

$= 2816$ sq.cm

∴ 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

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Solution:
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 × area required for each person
= 25 × 4
= 100 sq.m

ii. Surface area of the base of the tent = πr^2
∴ 100 = πr^2
∴ πr^2 = 100

iii. Volume of the tent= $\frac{1}{3}\pi r^2 h$
= $\frac{1}{3}$ x 100 x 18 .....[∵ πr^2 = 100]
= 100 x 6
= 600 cubic metre
∴ 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 se&son then how much minimum polythene
sheet is needed? ($\pi = \frac{22}{7}$ and $\sqrt{17.37} = 4.17$]
Given: Height of the heap (h) = 2.1 m.
diameter of the base (d) = 7.2 m
∴Radius of the base (r) = $\frac{d}{2} = \frac{7.2}{2}$ = 3.6 m
To find: Volume of the heap of the fodder and polythene sheet required
Solution:
i. Volume of the heap of fodder = $\frac{1}{3}\pi r^2 h$
= $\frac{1}{3}$ x $\frac{22}{7}$ x $(3.6)^2$ x 2.1
= $\frac{1}{3}$ x $\frac{22}{7}$ x 3.6 x 3.6 x 2.1
= 1 x 22 x 1.2 x 3.6 x 0.3
= 28.51 cubic metre
ii. Now, $l^2 = r^2 + h^2$
= $(3.6)^2 + (2.1)^2$
= 12.96 + 4.41
∴ l^2 =17.37

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∴ l^2 = $17.37----\sqrt{}$ .. .[Taking square root on both sides]
= 4.17 m
iii. Area of the polythene sheet needed to cover the heap of the fodder = Curved surface area of the conical heap
= πrl
= 227 x 3.6 x 4.17
= 47.18 sq.m
∴ 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.

Practice Set 9.3 Geometry 9th Std Maths Part 2 Answers Chapter 9 Surface Area and Volume

Question 1.
Find the surface areas and volumes of spheres of the following radii
i. 4 cm
ii. 9 cm
iii. 3.5 cm (π = 3.14)
i. Given: Radius (r) = 4 cm
To find: Surface area and volume of sphere
Solution:
Surface area of sphere = $4\pi r^2$
= 4 x 3.14 x 4^2
∴ Surface area of sphere = 200.96 sq.cm
Volume of sphere = $43\pi r^3$
= 43 x 3.14 x 4^2
∴ Volume of sphere = 267.95 cubic cm
ii. Given: Radius (r) = 9 cm
To find: Surface area and volume of sphere

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Solution:
Surface area of sphere = $4\pi r^2$
= 4 x 3.14 x 9^2
∴ Surface area of sphere = 1017.36 sq.cm

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3} \times 3.14 \times 9^3$$
$$= \frac{4}{3} \times 3.14 \times 9 \times 9 \times 9$$
$$= 4 \times 3.14 \times 3 \times 9 \times 9$$

∴ Volume of sphere = 3052.08 cubic cm

iii. Given: Radius (r) = 3.5 cm
To find: Surface area and volume of sphere
Solution:
Surface area of sphere = $4\pi r^2$
= 4 x 3.14 x $(3.5)^2$
∴ Surface area of sphere = 153.86 sq.cm
Volume of sphere = 43 πr^3
= 43 x 3.14 x $(3.5)^3$
∴ Volume of sphere = 179.50 cubic cm
Question 2.
If the radius of a solid hemisphere is 5 cm, then find its curved surface area and total surface area, (π = 3.14)
Given: Radius (r) = 5 cm
To find: Curved surface area and total surface area of hemisphere
Solution:
i. Curved surface area of hemisphere = $2\pi r^2$
= 2 x 3.14 x 5^2
= 2 x 3.14 x 25
= 50 x 3.14
= 157 sq.cm.

ii. Total surface area of hemisphere = $3\pi r^2$
= 3 x 3.14 x 5^2
= 235.5 sq.cm.

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∴ The curved surface area and totai surface area of hemisphere are 157 sq.cm, and 235.5 sq.cm, respectively.

Question 3.
If the surface area of a sphere is 2826 cm^2 then find its volume. (π = 3.14)
Given: Surface area of sphere = 2826 sq.cm.
To find: Volume of sphere
Solution:
i. Surface area of sphere = $4\pi r^2$
∴ 2826 = 4 x 3.14 x r^2
2826 = 282600 = 900
∴ $r2=28264\times3.14=2826004\times314=9004$
∴ r^2 = 225
∴ r = $225---\sqrt{}$ ... [Taking square root on both sides]
= 15 cm
ii. Volume of sphere = 43 πr^3
= 43 x 3.14 x 15^3
= 43 x 3.14 x 15 x 15 x 15
= 4 x 3.14 x 5 x 15 x 15
= 14130 cubic cm.
∴ The volume of the sphere is 14130 cubic cm.
Question 4.
Find the surface area of a sphere, if its volume is 38808 cubic cm. (π = 227)
Given: Volume of sphere = 38808 cubic cm.
To find: Surface area of sphere
Solution:

i. $\text{Volume of sphere} = \frac{4}{3}\pi r^3$

$\therefore \quad 38808 = \frac{4}{3} \times \frac{22}{7} \times r^3$

$\therefore \quad r^3 = \frac{38808 \times 3 \times 7}{4 \times 22}$

$= \frac{9702 \times 3 \times 7}{22}$

∴ r^3 = 441 x 21 = 21 x 21 x 21
∴ r = 21 cm ... [Taking cube root on both sides]
ii. Surface area of sphere = $4\pi r^2$
= 4 x 227 x 21

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= 4 x $\frac{22}{7}$ x 21 x 21
= 4 x 22 x 3 x 21
= 5544 sq.cm.
∴ The surface area of sphere is 5544 sq.cm.

Question 5.
Volume of a hemisphere is 18000π cubic cm. Find its diameter.
Given: Volume of hemisphere = 1 8000π cubic cm.
To find: Diameter of the hemisphere
Solution:
i. Volume of hemisphere = $\frac{2}{3}\pi r^3$

$$\therefore \quad 18000\pi = \frac{2}{3}\pi r^3$$

$$\therefore \quad 18000 = \frac{2}{3}r^3$$

$$\therefore \quad r^3 = \frac{18000 \times 3}{2}$$

= 9000 x 3
∴ r^3 = 27000
∴ r = $\sqrt[3]{27000}$ ... [Taking cube root on both sides]
= 30 cm
ii. Diameter = 2r
= 2 x 30 = 60 cm
∴ The diameter of the hemisphere is 60 cm.

Practice Set 9 Geometry 9th Std Maths Part 2 Answers Chapter 9 Surface Area and Volume

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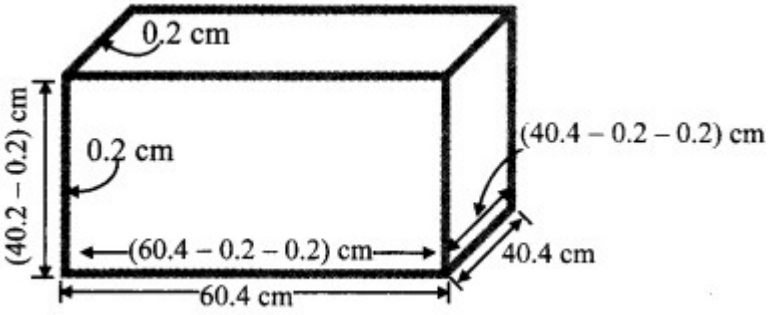
Question 1.
If diameter of a road roller is 0.9 m and its length is 1.4 m, how much area of a field will be pressed in its 500 rotations? (π = 227)
Given: For road roller,
diameter (d) = 0.9 m, length (h) = 1.4 m
To find: Area of a field pressed in 500 rotations
Solution:
i. Since, area of field pressed in 1 rotation of road roller = curved surface area of road roller
∴ Curved surface area of the road roller = 2πrh
= πdh ,..[∵ d = 2r]
= 227 x 0.9 x 1.4 7
= 22 x 0.9 x 0.2
= 3.96 sq.m.
ii. Area of land pressed in 1 rotation = 3.96 sq.m.
∴Area of land pressed in 500 rotations = 500 x 3.96
= 1980 sq.m.
∴ 1980 sq.m, land will be pressed in 500 rotations of the road roller.

Question 2.
To make an open fish tank, a glass sheet of 2 mm gauge is used. The outer length, breadth and height of the tank are 60.4 cm, 40.4 cm and 40.2 cm respectively. How much maximum volume of water will be contained in it ?
Given: Thickness of the glass = 2 mm,
outer length of the tank = 60.4 cm,
outer breadth of the tank = 40.4 cm,
outer height of the tank = 40.2 cm
To find: Volume of water fish tank contains
Solution:



i. Thickness oldie glass = 2 mm.

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= 210 cm
= 0.2 cm
Outerlengthofthetank = 60.4 cm
∴ Inner length oldie tank (l) = Outer length – thickness oldie glass on both sides
= 60.4 – 0.2 – 0.2
= 60cm
Outer breadth oldie tank = 40.4 cm
∴ Inner breadth of the tank (b) = 40.4 – 0.2 – 0.2
= 40 cm
Outer height of the tank = 40.2 cm
∴Inner height of the tank (h) = 40.2 – 0.2
= 40 cm
ii. Maximum volume of water that can be contained in the tank = volume of the tank
= l x b x h
= 60 x 40 x 40
= 96000 cubic cm.
∴ The fishtank can contain maximum of 96000 cubic cm. water in it.

Question 3.
If the ratio of radius of base and height of a cone is 5 : 12 and its volume is 314 cubic metre. Find its perpendicular height and slant height (π = 3.14).
Given: Ratio of radius of base and height of a cone = 5 : 12,
Volume = 314 cubic metre
To find: Perpendicular height (h) and slant height (l)
Solution:
i. The ratio of radius and height of cone is 5 : 12
Let the common multiple be x.
∴ Radius of base (r) = 5x
Perpendicular height (h) = 12x

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

$$\therefore \quad 314 = \frac{1}{3} \times 3.14 \times (5x)^2 \times (12x)$$

$$\therefore \quad 314 = \frac{1}{3} \times 3.14 \times 25x^2 \times 12x$$

$$\therefore \quad x^3 = \frac{314 \times 3}{3.14 \times 25 \times 12}$$

$$= \frac{314 \times 3 \times 100}{314 \times 25 \times 12}$$

$\therefore x^3 = 1$

$\therefore x = 1$ ... [Taking cube root on both sides]

$\therefore r = 5x = 5(1) = 5m$

$h = 12x = 12(1) = 12$ m

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

$= 5^2 + 12^2$

$= 25 + 144$

$\therefore l^2 = 169$

$\therefore l = \sqrt{169}$ ... [Taking square root on both sides]

$= 13$ m

The perpendicular height and slant height of the cone are 12 m and 13 m respectively.

Question 4.

Find the radius of a sphere if its volume is 904.32 cubic cm. ($\pi = 3.14$)

Given: Volume of sphere = 904.32 cubic cm.

To find: Radius of a sphere

Solution:

Volume of sphere = $\frac{4}{3}\pi r^3$

$\therefore 904.32 = \frac{4}{3} \times 3.14 \times r^3$

$$\therefore \quad r^3 = \frac{904.32 \times 3}{4 \times 3.14}$$

$$= \frac{90432 \times 3}{4 \times 314}$$

$$= \frac{288 \times 3}{4}$$

$= 216$

$\therefore r = \sqrt[3]{216}$ ... [Taking cube root on both sides]

= 6 cm

∴ The radius of the sphere is 6 cm.

Question 5.

Total surface area of a cube is 864 sq.cm. Find its volume.

Given: Total surface area of cube = 864 sq. cm

To find: Volume of cube

Solution:

i. Total surface area of cube = $6l^2$

∴ $864 = 6l^2$

∴ $l^2 = 6-\sqrt{864}$

∴ $l^2 = 144$

∴ $l = 144---\sqrt{}$ ... [Taking square root on both sides]

= 12 cm

ii. Volume of cube = l^2

= 12^3

= 1728 cubic cm.

∴ The volume of cube is 1728 cubic cm.

Question 6.

Find the volume of a sphere, if its surface area is 154 sq.cm.

Given: Surface area of sphere = 154 sq. cm.

To find: Volume of sphere

Solution:

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

$$\therefore \quad 154 = 4 \times \frac{22}{7} \times r^2$$

$$\therefore \quad r^2 = \frac{154 \times 7}{4 \times 22} = \frac{49}{4}$$

$$\therefore \quad r = \sqrt{\frac{49}{4}}$$

...[Taking square root on both sides]

$$= \frac{7}{2} \text{ cm}$$

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ii. Volume of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{7}{2}\right)^3$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$

$= \frac{1}{3} \times 22 \times 1 \times 7 \times \frac{7}{2}$

$= 179.67$ cubic cm.

∴ The volume of sphere is 179.67 cubic cm.

Question 7.
Total surface area of a cone is 616 sq.cm. If the slant 'height of the cone Is three times the radius of its base, find its slant height.
Given: Total surface area of a cone = 616 sq.cm., slant height of the cone is three times the radius of its base
To find: Slant height (l)
Solution:
i. Let the radius of base be r cm.
∴ Slant height (l) = 3r cm
Total surface area of cone = πr (l + r)
∴ 616 = πr(l + r)
∴ 616 = $7-\sqrt{22}$ x r x (3r + r)
∴ 616 = $7-\sqrt{22}$ x $4r^2$

∴ $r^2 = \frac{616 \times 7}{22 \times 4}$

$= \frac{28 \times 7}{4}$

∴ $r^2 = 49$
∴ r = $49--\sqrt{}$ ... [Taking square root on both sides]
= 7
ii. Slant height (l) = 3r = 3 x 7 = 21 cm
∴ The slant height of the cone is 21 cm.

Question 8.
The inner diameter of a well is 4.20 metre and its depth is 10 metre. Find the inner surface area of the well. Find the cost of plastering it from inside at the rate ₹ 52 per sq.m.

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- *Arjun*

Given: Inner diameter (d) = 4.2 m,
To find: depth (h) = 10 m,
rate of plastering = ₹ 52 per sq.m.
Inner surface area and total cost of plastering
Solution:
i. Inner curved surface area of the well = 2πrh
= πdh ...[∵ d = 2r]
= $7-\sqrt{22}$ x 4.2 x 10
= $7-\sqrt{22}$ x 42
= 22 x 6
= 132 sq.m.
ii. Rate of plastering = ₹52 per sq.m.
∴ Total cost = Curved surface area x Rate of plastering
= 132 x 52 = ₹6864
∴ The cost of plastering the well from inside is ₹6864.

Question 9.
The length of a road roller is 2.1 m and its diameter is 1.4 m. For levelling a ground 500 rotations of the road roller were required. How much area of ground was levelled by the road roller? Find the cost of levelling at the rate of ₹ 7 per sq.m.
Given: For road roller,
diameter (d) = 1.4 m,
length (h) = 2.1 m
number of rotations required for levelling the ground = 500,
rate of levelling = ₹ 7 per sq. m.
To find: Area of ground leveled by the road roller and cost of levelling
Solution:
i. Since, area of ground levelled in 1 rotation of road roller = curved surface area of road roller
∴Curved surface area of the road roller = 2πrh
= πdh ...[∵ d = 2r]
= $\frac{22}{7}$ x 1.4 x 2.1
= 22 x 0.2 x 2.1
= 9.24 sq.m.

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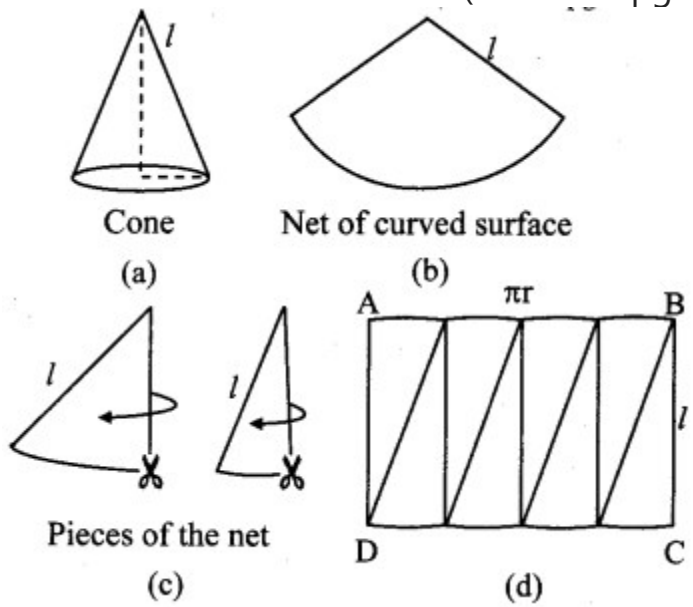
- *Arjun*

ii. Area of ground levelled in 1 rotation = 9.24 sq.m.
∴Area of ground levelled in 500 rotations = 9.24 x 500
= 4620 sq.m.

iii. Rate of levelling ₹ 7 per sq.m.
∴Total cost = Area of ground levelled x Rate of levelling
= 4620 x 7
= ₹32340
∴ The road roller levels 4620 sq.m. land in 500 rotation, and the cost of levelling is ₹32340.

Maharashtra Board Class 9 Maths Chapter 9 Surface Area and Volume Practice Set 9 Intext Questions and Activities

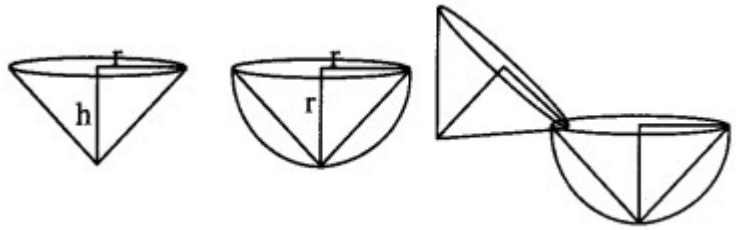
Question 1.
Curved surface area of cone. (Textbook pg. no. 116)



Circumference of base of the cone = 2πr
As shown in the figure (c), make pieces of the net as small as possible. Join them as shown in the figure (d),. By joining the small pieces of net of the cone, we get a rectangle ABCD approximately.
Total length of AB and CD is 2πr.
∴ length of side AB of rectangle ABCD is πr and length of side CD is also πr.
Length of side BC of rectangle = slant height of cone = l.
Curved surface area of cone is equal to the area of the rectangle.
∴ curved surface area of cone = Area of rectangle = AB x BC = πr x l = πrl

- *Digvijay*
- *Arjun*

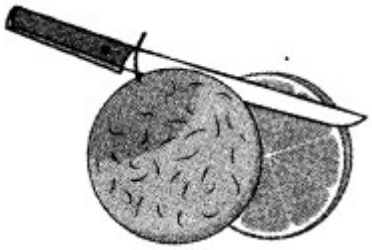
Question 2.
Prepare a cylinder of a card sheet, keeping one of its faces open. Prepare an open cone of card sheet which will have the same base-radius and the same height as that of the cylinder. Pour fine sand in the cone till it just fills up the cone. Empty the cone in the cylinder. Repeat the procedure till the cylinder is just filled up with sand. Note how many coneful of sand is required to fill up the cylinder. (Textbook pg, no 117)



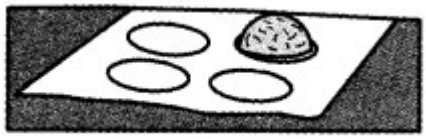
Answer:
To fill the cylinder, three coneful of sand is required.

Question 3.
Finding total surface area of sphere. (Textbook pg, no 120)

i. Take a sweet lime (Mosambe), Cut it into two equal parts.



ii. Take one of the parts. Place its circular face on a paper. Draw its circular border. Copy three more such circles. Again, cut each half of the sweet lime into two equal parts.



iii. Now you get 4 quarters of sweet lime. Separate the peel of a quarter part. Cut it into pieces as small as possible. Try to cover one o'f the circles drawn, by the small pieces. Observe that the circle gets nearly covered.
The activity suggests that,
Curved surface area of a sphere = $4\pi r^2$

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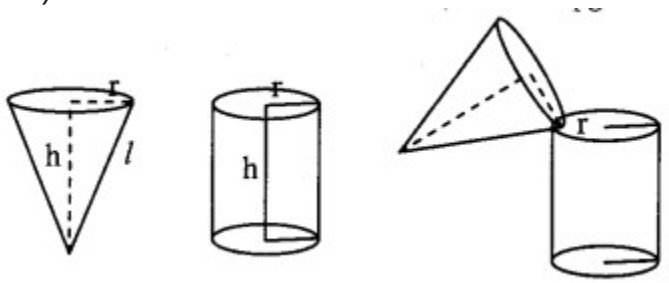
- *Arjun*

∴ Curved surface area of a sphere = 4 x Area of a circle

Question 4.
Make a cone and a hemisphere of cardsheet such that radii of cone and hemisphere are equal and height of cone is equal to radius of the hemisphere.
Fill the cone with fine sand. Pour the sand in the hemisphere. How many cones are required to fill the hemisphere completely ? (Textbook pg. no. 121)



Answer:
To fill the hemisphere, two coneful of sand is required.