



# MATHS

## NCERT - NCERT Maths(Telugu)

### SURFACE AREAS AND VOLUMES

#### Example

1. A Rectangular paper of width 14 cm is folded along its width and a cylinder of radius 20 cm

is formed. Find the volume of the cylinder

(Take  $\pi = \frac{22}{7}$ )



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2. A Rectangular piece of paper  $11\text{cm} \times 4\text{ cm}$  is folded without overlapping to make a cylinder of height 4 cm. Find the volume of the cylinder.



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3. A rectangular sheet of paper  $44\text{cm} \times 18\text{cm}$  is rolled along the length to form a cylinder. Assuming that the cylinder is solid (Completely filled), find its radius and the total surface area.



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4. Circular discs 5 mm thickness, are placed one above the other to form a cylinder of

curved surface area  $462\text{cm}^2$  . Find the number of discs, if the radius is 3.5 cm



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5. Find the slant height and vertical height of a Cone with radius 5.6 cm and curved surface area  $158.4\text{cm}^2$  .



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6. If the surface area of a sphere is  $154\text{cm}^2$  ,  
find its radius



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7. A hemispherical bowl is made up of stone  
whose thickness is 5 cm. If the inner radius is  
35 cm, find the total surface area of the bowl.



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8. The hollow sphere, in which the circus motor cyclist performs his stunts ,has a diameter of 7m. Find the area available to the motor cyclist for riding.



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9. A shotput is a metallic sphere of radius 4.9 cm .If the density of the metal is 7.8g. Per  $cm^3$  find the mass of the shotput.



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**10.** A hemispherical bowl has a radius of 3.5 cm

What would be the volume of water it would contains?



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**11.** A Rectangular paper of width 14 cm is folded along its width and a cylinder of radius

20 cm is formed. Find the volume of the

cylinder (Take  $\pi = \frac{22}{7}$ )



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**12.** A Rectangular piece of paper  $11\text{cm} \times 4\text{ cm}$  is folded without overlapping to make a cylinder of height 4 cm. Find the volume of the cylinder.



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**13.** A rectangular sheet of paper  $44\text{cm} \times 18\text{cm}$  is rolled along the length to form a cylinder. Assuming that the cylinder is solid



(Completely filled), find its radius and the total surface area.



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**14.** Circular discs 5 mm thickness, are placed one above the other to form a cylinder of curved surface area  $462\text{cm}^2$ . Find the number of discs, if the radius is 3.5 cm



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**15.** A hollow cylinder having external radius 8 cm and height 10 cm has a total surface area of  $338\pi\text{cm}^2$ . Find the thickness of the hollow metallic cylinder.



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**16.** corn cob , shaped like a cone, has the radius of its broadest end as 1.4 cm and length (height) as 12 cm. If each  $1\text{cm}^2$  of the surface of the cob carries an average of four grains,

find how many grains approximately you would find on the entire cob.



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**17.** Find the slant height and vertical height of a Cone with radius 5.6 cm and curved surface area  $158.4\text{cm}^2$  .



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**18.** tent is in the form of a cylinder surmounted by a cone having its diameter of the base equal to 24 m. The height of cylinder is 11 m and the vertex of the cone is 5m above the cylinder. Find the cost of making the tent, if the rate of canvas is Rs. 10 per  $m^2$



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**19.** A conical tent was erected by an army at a base camp with height 3 m and diameter 8 m.

Find the slant height of the tent.



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20. A conical tent was erected by army at a base camp with height 3m. and base diameter 8m. Find,

If every person required  $3.5m^3$ . air, how many can be seated



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21. If the surface area of a sphere is  $154\text{cm}^2$ , find its radius.



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22. A hemispherical bowl is made up of stone whose thickness is 5 cm. If the inner radius is 35 cm, find the total surface area of the bowl.



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**23.** The hemispherical dome of a building needs to be painted (see fig 1). If the circumference of the base of dome is 17.6 m, find the cost of painting it, given the cost of painting is Rs.5 per  $100\text{cm}^2$ .



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**24.** The hollow sphere, in which the circus motor cyclist performs his stunts, has a

diameter of 7m. Find the area available to the motor cyclist for riding.



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**25.** A shotput is a metallic sphere of radius 4.9 cm. If the density of the metal is 7.8g. per  $cm^3$ , find the mass of the shotput.



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**26.** A hemispherical bowl has a radius of 3.5 cm  
What would be the volume of water it would  
contains?

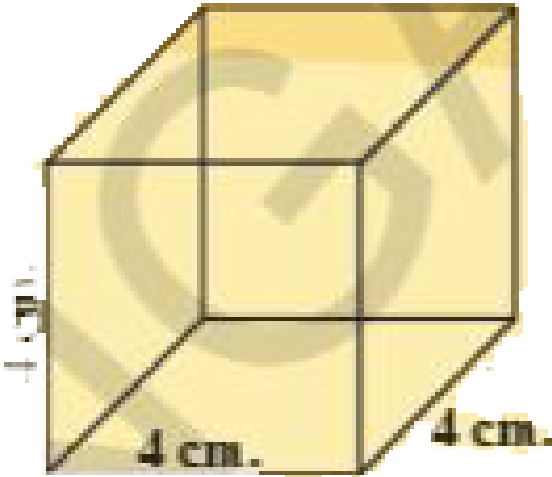


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**Do This**

**1.** Find the total Surface area and lateral surface area of the Cube with side 4 cm. (By

using the formulae deduced above)



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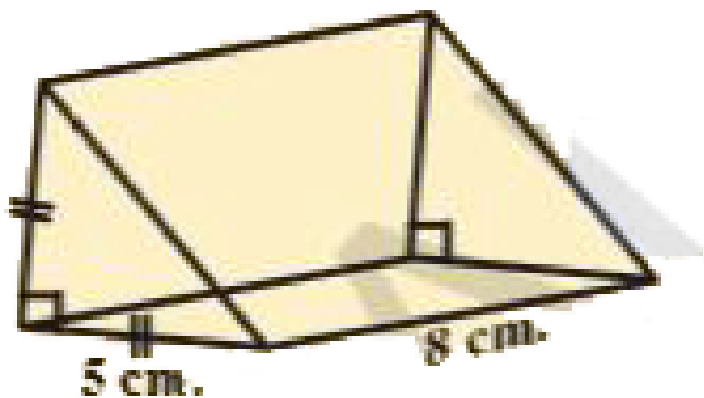
2. Find the volume of cuboid if  $l=12$  cm ,  $b = 10$  cm . And  $h=8$ cm.

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3. Find the volume of cube if,its edge is 10 cm.

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4. Find the volume of isosceles right angled triangular prism in





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5. Find the volume of a pyramid whose square base is 10 cm. and height 8 cm.



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6. The volume of cube is 1728 cubic cm. Find the volume of square pyramid of the same height.



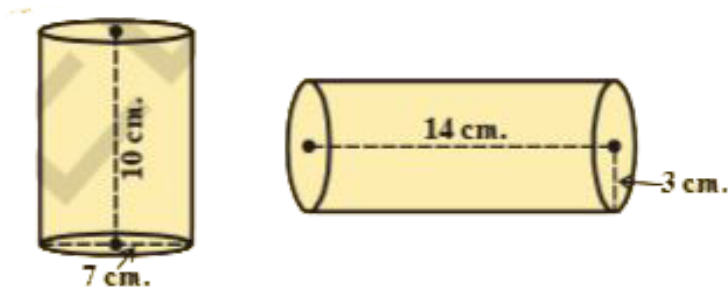
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7. Find CSA of each of following cylinders

(i)  $r = x\text{ cm}, h = y\text{ cm}$

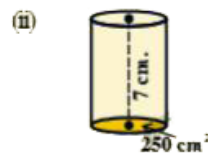
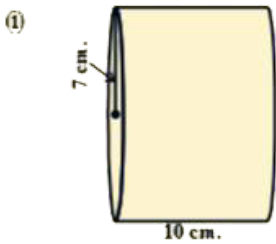
(ii)  $d = 7\text{ cm}, h = 10\text{ cm}$

(iii)  $r = 3, h = 14\text{ cm}$



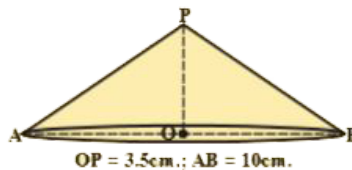
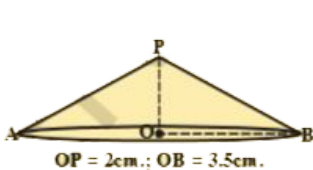
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8. Find the Total surface area of each of the following cylinders.



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9. Find the curved surface area and total surface area of the each following Right Circular Cones



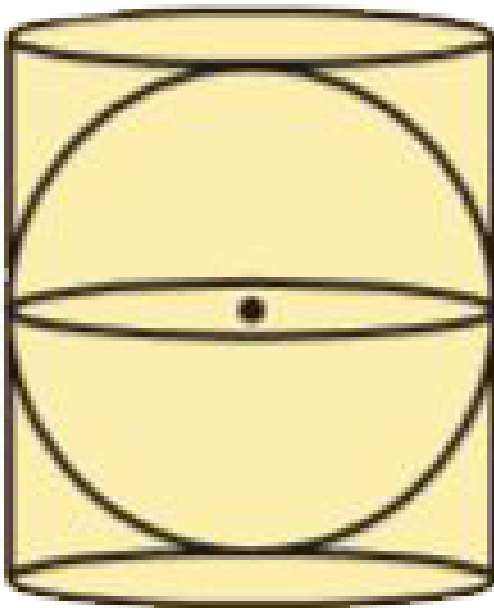
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**10.** A right circular cylinder just enclose a sphere of radius  $r$

Find ( i) surface area of the sphere

(ii) curved surface area of the cylinder

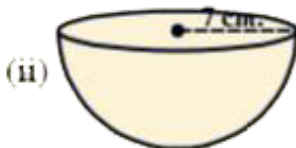
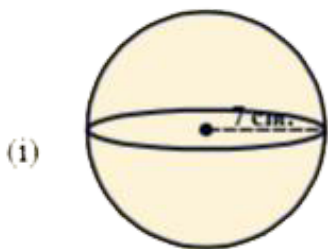
(iii) ratio of the areas obtained in (i) and (ii)





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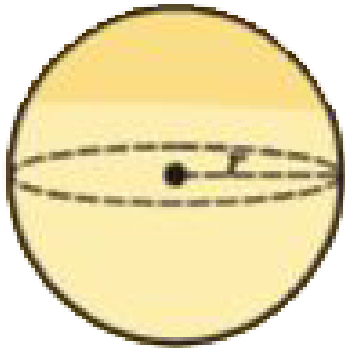
11. Find the surface area of each of the following figure.



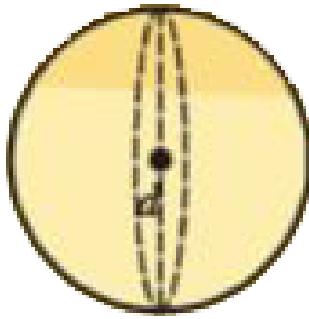
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12. Find the volume of the sphere given in the adjacent figures.





$$r = 3\text{cm.}$$



$$d = 5.4\text{cm.}$$



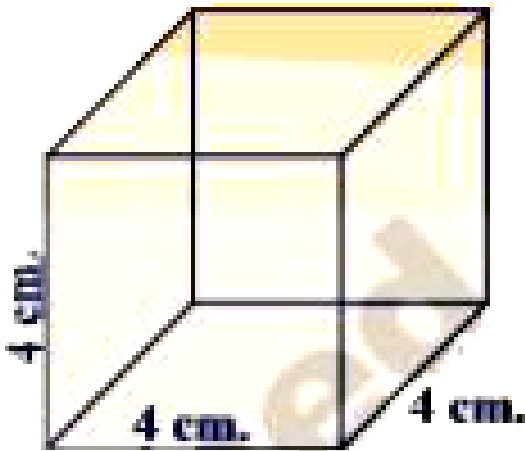
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**13.** Find the volume of sphere of radius 6.3 cm



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**14.** Find the total Surface area and lateral surface area of the Cube with side 4 cm. By using the formulae deduced in above try this.



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**15.** Each edge of a cube is increased by 50%.  
Find the percentage Increase In the surface area.



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**16.** Find the volume of cuboid if  $l=12$  cm ,  $b = 10$  cm . And  $h=8$ cm.



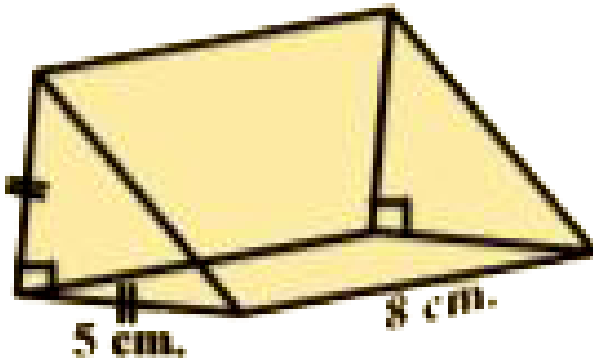
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17. Find the volume of cube if, its edge is 10 cm.



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18. Find the volume of isosceles right angled triangular prism in (fig. 1).



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**19.** Find the volume of a pyramid whose square base is 10 cm. and height 8 cm.



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**20.** The volume of cube is 1728 cubic cm. Find the volume of square pyramid of the same height.



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21. Find CSA of each of following cylinders

$r = x$  cm.,  $h = y$  cm.



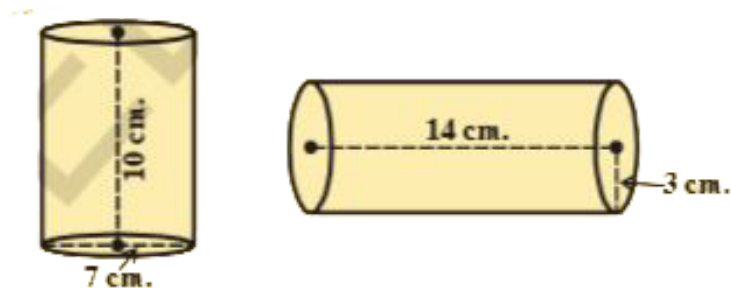
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22. Find CSA of each of following cylinders

(i)  $r = x$  cm.,  $h = y$  cm

(ii)  $d = 7$  cm.,  $h = 10$  cm

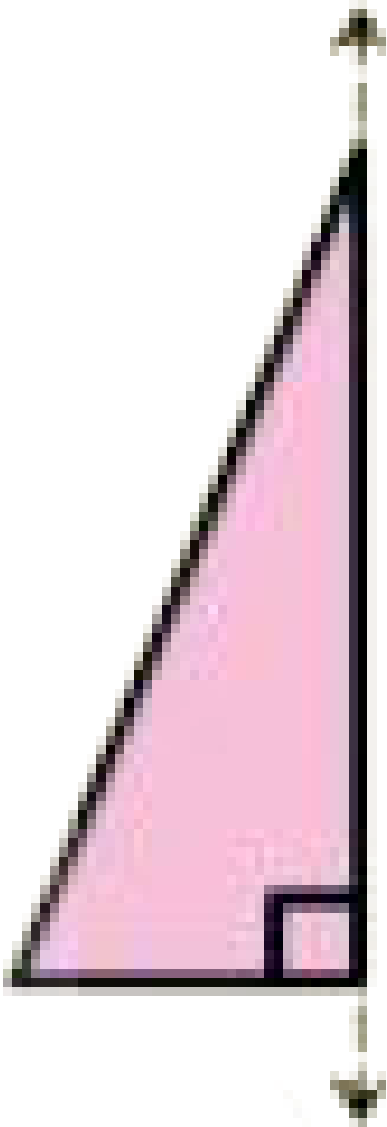
(iii)  $r = 3$ ,  $h = 14\text{cm}$



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**23.** Cut a right angled triangle, stick a string along its perpendicular side, as shown in fig. (i) hold the both the sides of a string with your hands and rotate it with constant speed. What

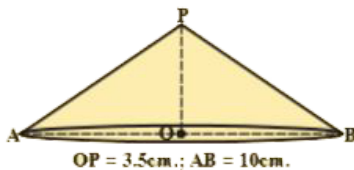
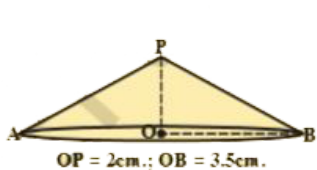
do you observe ?



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24. Find the curved surface area and total surface area of the each following Right Circular Cones



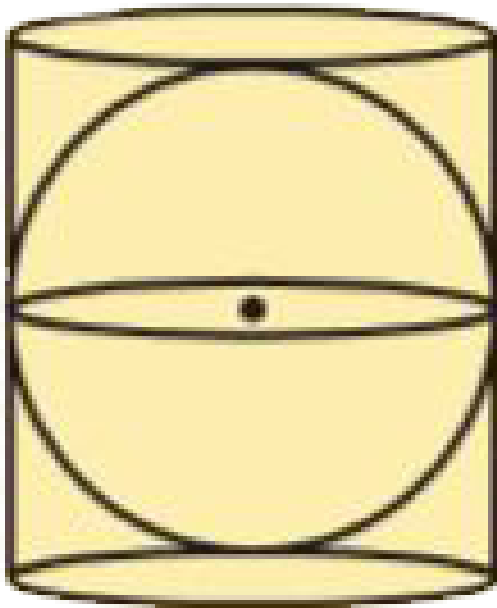
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25. A right circular cylinder just enclose a sphere of radius  $r$

Find ( i) surface area of the sphere

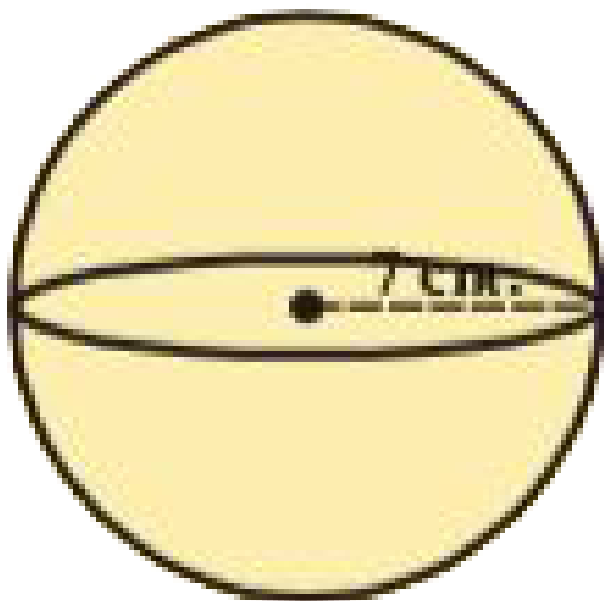
(ii) curved surface area of the cylinder

(iii) ratio of the areas obtained in (i) and (ii)



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26. Find the surface area of each the following



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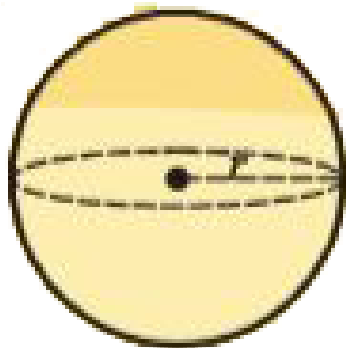
27. Find the surface area of each the following

.

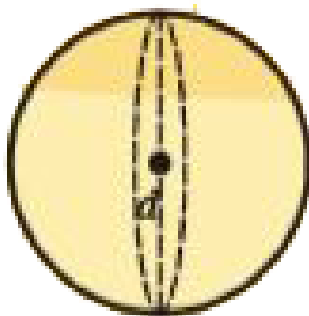


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28. Find the volume of the sphere given in the adjacent



$$r = 3\text{cm.}$$



$$d = 5.4\text{cm.}$$



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29. Find the volume of sphere of radius 6.3 cm.



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## Try This

1. Find the edge of a cube whose volume is  $1000\text{cm}^3$



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2. If the radius of a cylinder is doubled keeping its lateral surface area the same, then what is its height ?



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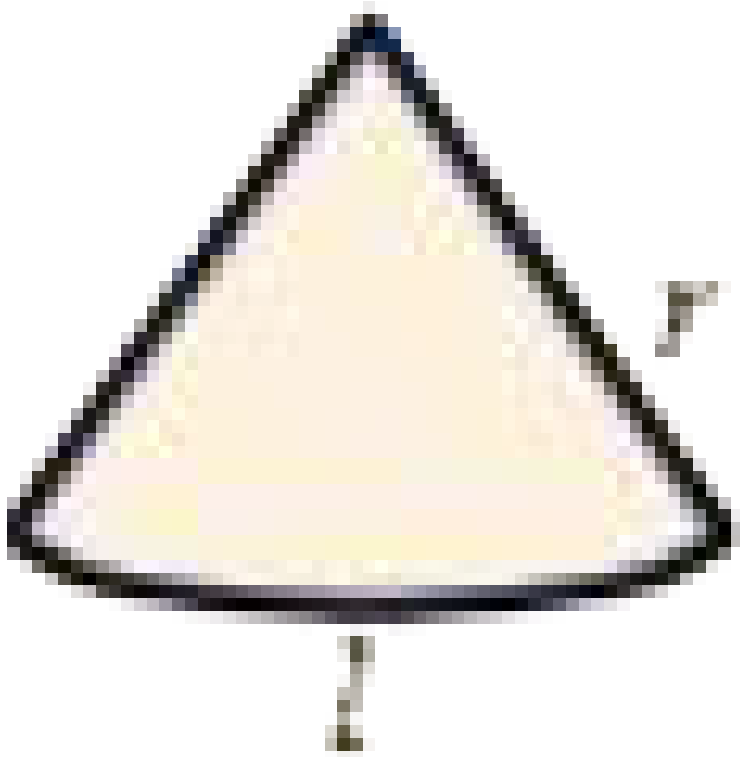
3. A hot water system (Geyser) consists of a cylindrical pipe of length 14 m and diameter 5 cm. Find the total radiating surface of hot water system.



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4. A sector with radius ' $r$ ' and length of its arc ' $l$ ' is cut from a circular sheet of paper. Fold it as a cone. How can you derive the formula of

its curved surface area  $A = \pi r l$



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5. Can you find the surface area of sphere in any other way?



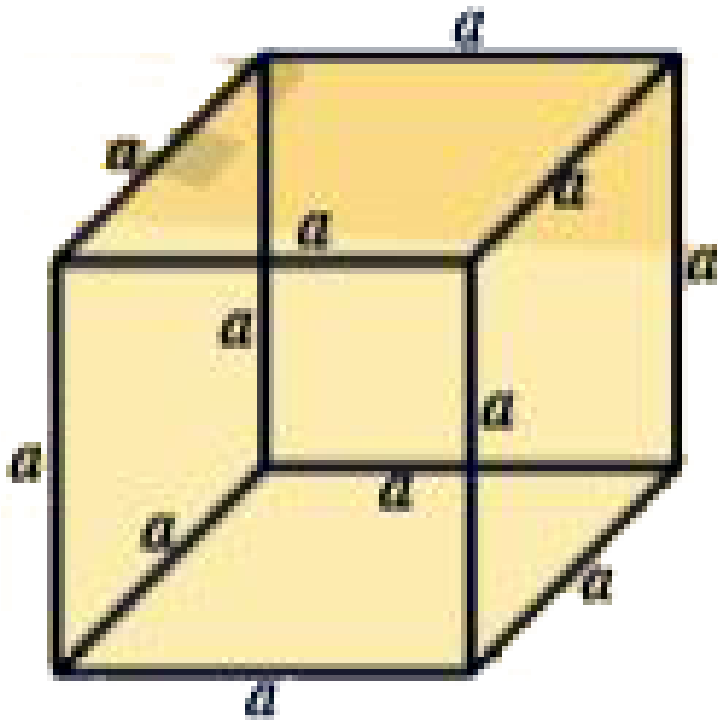
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6. Take a cube of edge 'l' cm. and cut it as we did in the previous activity and find total surface area and lateral surface area of cube.



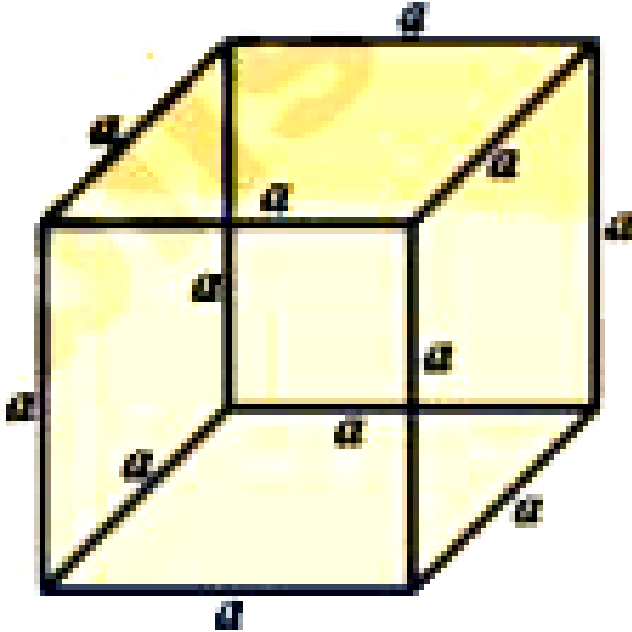
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7. Find the volume of a cube whose edge is 'a' units.



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8. Find the edge of a cube whose volume is  $1000\text{cm}^3$



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9. If the radius of a cylinder is doubled keeping its lateral surface area the same, then what is its height ?



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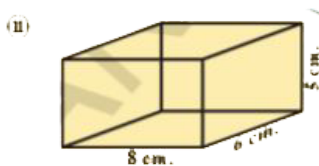
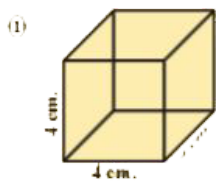
10. A hot water system (Geyser) consists of a cylindrical pipe of length 14 m and diameter 5 cm. Find the total radiating surface of hot water system.



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## Exercise 10 1

1. Find the later surface area and total surface area of the following right prisms.



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2. The total surface area of a cube is 1350 sq.m

Find its volume.



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3. Find the area of four walls of a room

(Assume that there are no doors or windows )

if its length 12m. Breadth 10 m. and height 7.5

m.



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4. The volume of a cuboid is  $1200\text{cm}^3$  The length 15 cm .and breadth is 10 cm , Find its height



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5. How does the total surface area of a box change if

(i) Each dimension is doubled?

(ii) Each dimension is tripled?

Express in words .Can you find the total

surface area of the box if each dimension is raised to  $n$  times?



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6. The base of prism. Is triangular in shape with sides 3cm , 4cm , and 5cm , Find the volume of the prism if its height is 10 cm .



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7. A regular square pyramid is 3m. Height and the perimeter of its base is 16 m. Find the volume of the pyramid.



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8. An Olympic swimming pool is in the shape of a cuboid of dimensions 50m. Long and 25 m. wide. If it is 3m . Deep throughout , how many liters of water does it hold?

( $1\text{cu. m} = 1000\text{liters}$ )





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## Exercise 10 2

1. A closed cylindrical tank of height 1.4 m. and radius of the base is 56 cm. is made up of a thick metal sheet. How much metal sheet is required (Express in square meters)



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2. The volume of a cylinder is  $308\text{cm}^3$ . Its height is  $8\text{cm}$ . Find its lateral surface area and total surface area.



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3. A metal cuboid of dimension  $22\text{cm} \times 15\text{cm} \times 7.5\text{cm}$ , was melted and cast into a cylinder of height  $14\text{cm}$ . What is its radius?



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4. An overhead water tanker is in the shape of a cylinder has capacity of 61.6 cu.mts. The diameter of the tank is 5.6 m. Find the height of the tank.

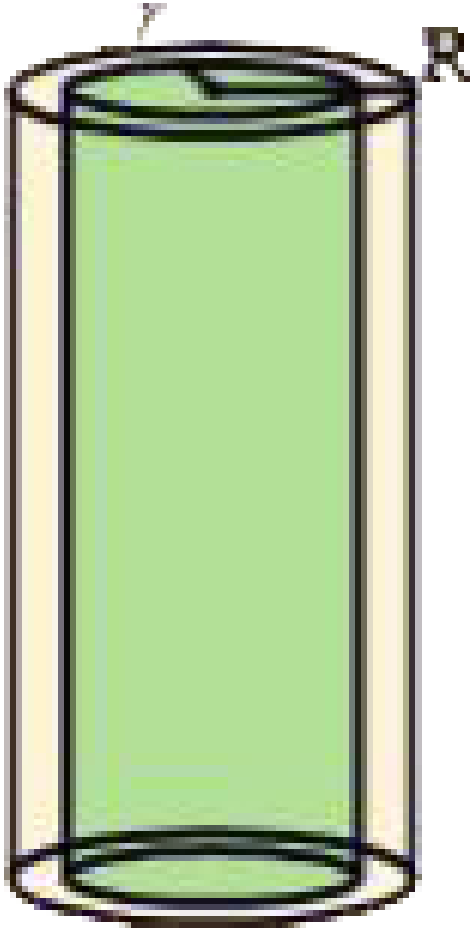


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5. A metal pipe is 77 cm .long .The inner diameter of a cross section is 4 cm. the outer diameter being 4.4 cm .Find its

(i) inner curved surface area

outer curved surface area.



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6. A cylindrical pillar has a diameter of 56 cm and is of 35 m high. There are 16 pillars around the building. Find the cost of painting the curved surface area of all the pillars at the rate of rupees 5.50 per  $1m^2$



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7. The diameter of a roller is 84 cm and its length is 120 cm . It takes 500 complete revolutions to roll once over the play ground

to level. Find the area of the play ground in  $m^2$



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**8.** The inner diameter of a circular well is 3.5 m.

It is 10 m deep . Find

(i) its inner curved surface area

(ii) The cost of plastering this curved surface

at the rate of Rs. 40 *per*  $m^2$



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## 9. Find

(i) The total surface area of a closed cylindrical petrol storage tank whose diameter  $4.2\text{m}$ . and height  $4.5\text{ m}$ .



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**10.** A one side open cylindrical drum has inner radius  $28\text{ cm}$ , and height  $2.1\text{ m}$  .How much water you can store in the drum . Express in litres .(  $1\text{ litre}= 1000\text{cc.}$  )



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11. The curved surface area of the cylinder is  $1760\text{cm}^2$ . And its volume is  $12320\text{cm}^3$  Find its height.



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### Exercise 10 3

1. The base area of a cone is  $38.5\text{cm}^2$ . Its volume is  $77\text{cm}^3$  Find its height .



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2. The volume of a cone is  $462m^3$  . Its base radius is 7m. Find its height.



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3. Curved surface area of a cone is  $308cm^2$  and its slant height is 14 cm Find.

(i) radius of the base (ii) Total surface area of the cone.





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4. The cost of painting the total surface area of a cone at 25 paise per  $cm^2$  is rupees 176 .Find the volume of the cone ,If its slant height is 25 cm.



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5. From a circle of radius 15cm . A sector with angle  $216^\circ$  is cut out and its bounding radius are bent so as to form a cone . Find its volume.



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6. The height of a tent is 9m. Its base diameter is 24m. What is its slant height? Find the cost of canvas cloth required if it costs rupees 14 per sq.m.



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7. The curved surface area of a cone is  $1159\frac{5}{7}cm^2$ . Area of its base is  $254\frac{4}{7}cm^2$  Find

its volume.



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**8.** A tent is cylindrical to a height of 4.8 m .and conical above it. The radius of the base is 4.5 m. and total height of the tent is 10.8 m . Find the canvas required for the tent in square meters.



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9. What length of tarpaulin 3m wide be required to make a conical tent of height 8m and base radius 6m? Assume that extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (use  $\pi = 3.14$ )



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10. A Joker's cap is in the form of a right circular cone of base radius 7cm and height 27

cm. Find the area of the sheet required to make 10 such caps.



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**11.** Water is pouring into a conical vessel of diameter 5.2m. And slant height 6.8 m(as shown in the adjoining ) , at the rate of  $1.8 \text{ m}^3$  per minute .How long will it take to fill the

vessel?



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12. Two similar cones have volumes  $12\pi$  cu. Units and  $96\pi$  cu. Units. If the curved surface area of the smaller cone is  $15\pi$ sq. units ,What is the curved surface area of the larger one?



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**Exercise 10 4**

1. The radius of sphere is  $3.5\text{cm}$  Find its surface area and volume .



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2. The surface area of sphere is  $1018\frac{2}{7}$  Sq.cm .

What is its volume?



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3. The length of equator of the globe is 44cm .

Find its surface area



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4. The diameter of a spherical ball is 21cm .

How much leather is required to prepare 5 such balls.



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5. If the ratio of radii of two spheres is 2:3 then the ratio of their surface areas is



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6. Find the total surface area of a hemisphere of radius 10 cm . (use  $\pi = 3.14$



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7. The diameter of a spherical balloon increases from 14cm . To 28 cm . As air is being pumped into it. Find the ratio of surface area to inner surface area of the balloons in the two cases.



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8. A hemispherical bowl is made of brass .0.25 cm. thickness .The inner radius of the bowl is

5cm. Find the ratio of outer surface area to inner surface area.



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9. The diameter of a lead ball is 2.1 cm The density of the lead used is  $11.34g/c^3$  What is the weight of the ball ?



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**10.** A metallic cylinder of diameter 5cm. And height  $3\frac{1}{3}cm$  is melted and cast into a sphere.

What is its diameter.



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**11.** How many litres of milk can a hemispherical bowl of diameter 10.5 cm . Hold ?



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**12.** A hemispherical bowl has diameter 9 cm. The liquid is poured into cylindrical bottles of diameter 3 cm. and height 3 cm. If a full bowl of liquid is filled in the bottles. Find how many bottles are required.

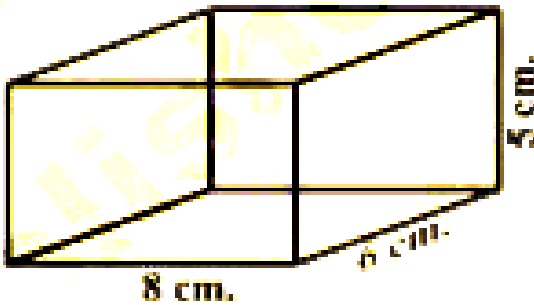


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**Exercise 10 1**

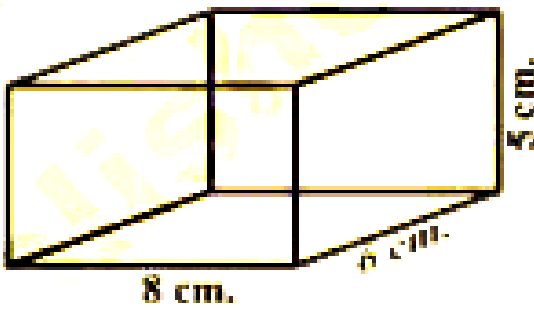


1. Find the later surface area and total surface area of the following right prisms.



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2. Find the later surface area and total surface area of the following right prisms.



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Find its volume.

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7. The base of a prism is triangular in shape with sides 3 cm., 4 cm. and 5 cm. Find the volume of the prism if its height is 10 cm.



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8. A regular square pyramid is 3 m. height and the perimeter of its base is 16 m. Find the volume of the pyramid.



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9. An Olympic swimming pool is in the shape of a cuboid of dimensions 50m. Long and 25 m. wide. If it is 3m . Deep throughout , how many liters of water does it hold?  
( $1\text{cu. m} = 1000\text{liters}$ )



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## Exercise 10 2

1. A closed cylindrical tank of height 1.4 m. and radius of the base is 56 cm. is made up of a

thick metal sheet. How much metal sheet is required (Express in square meters)



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2. The volume of a cylinder is  $308\text{cm}^3$ . Its heights is 8cm . Find its lateral surface area and total surface area.



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3. A metal cuboid of dimension  $22\text{cm} \times 15\text{cm} \times 7.5\text{cm}$ , was melted and cast into a cylinder of height  $14\text{cm}$ . What is its radius?



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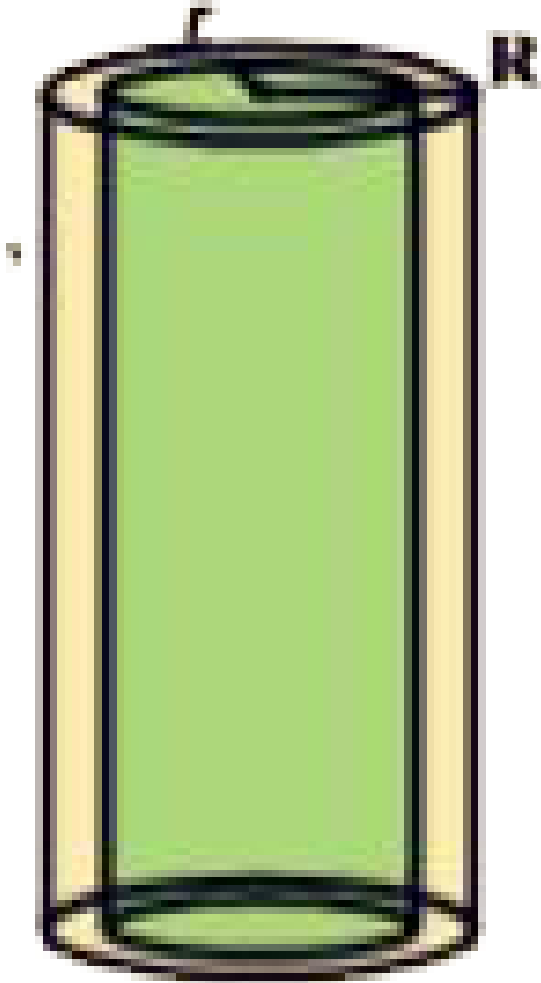
4. An overhead water tanker is in the shape of a cylinder has capacity of  $61.6\text{ cu.mts}$ . The diameter of the tank is  $5.6\text{ m}$ . Find the height of the tank.





5. A metal pipe is 77 cm. long. The inner diameter of a cross section is 4 cm., the outer diameter being 4.4 cm. (see figure) Find its

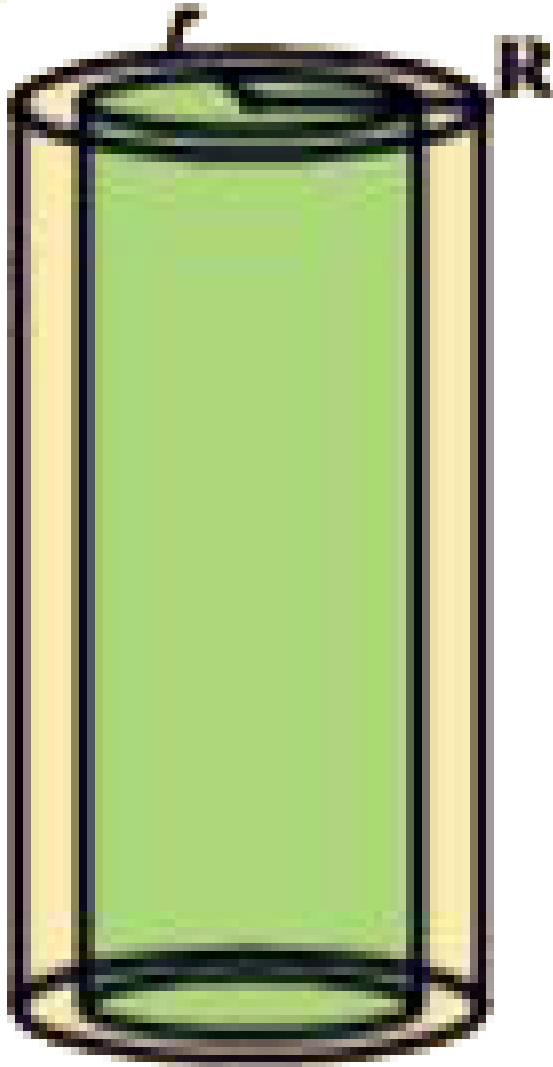
Total surface area.



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**6.** A metal pipe is 77 cm. long. The inner diameter of a cross section is 4 cm., the outer diameter being 4.4 cm. (see figure) Find its

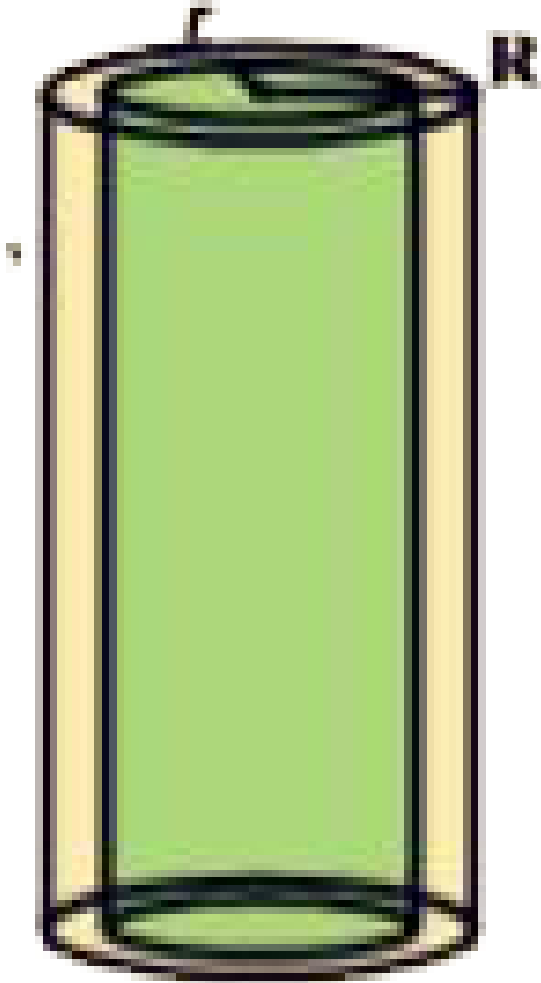
outer curved surface area



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7. A metal pipe is 77 cm. long. The inner diameter of a cross section is 4 cm., the outer diameter being 4.4 cm. (see figure) Find its

Total surface area.



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**8.** A cylindrical pillar has a diameter of 56 cm and is of 35 m high. There are 16 pillars around the building. Find the cost of painting the curved surface area of all the pillars at the rate of rupees 5.50 per  $1m^2$



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**9.** The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to roll once over the play ground

to level. Find the area Of the play ground in  $m^2$



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**10.** The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find ( i ) its inner curved surface area ( ii ) the cost of plastering this curved surface at the rate of Rs. 40 per  $m^2$



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**11.** The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find

The cost of plastering this curved surface at the rate of Rs. 40 per  $m^2$ .



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**12.** Find the total surface area of a closed cylindrical petrol storage tank whose diameter 4.2 m and height 4.5 m.



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**13.** Find How much steel sheet was actually Used, if  $\frac{1}{12}$  of the steel was wasted in making the tank ?



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**14.** A one side open cylindrical drum has inner radius 28 cm and height 2.1 m. How much water you can store in the drum? Express in litres. (1 litre = 1000 c.c)



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15. The curved surface area of the cylinder is  $1760\text{cm}^2$ . And its volume is  $12320\text{cm}^3$  Find its height.



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### Exercise 10 3

1. The base area of a cone is  $38.5\text{cm}^2$  .Its volume is  $77\text{cm}^3$  Find its height .



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2. The volume of a cone is  $462m^3$  . Its base radius is 7m. Find its height.



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3. Curved surface area of a cone is  $308cm^2$  and its slant height is 14 cm Find.

(i) radius of the base (ii) Total surface area of the cone.



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4. Curved surface area of a cone is  $308\text{cm}^2$  and its slant height is 14 cm Find.

Total surface area of the cone.



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5. The cost of painting the total surface area of a cone at 25 paise per  $\text{cm}^2$  is rupees 176 .Find the volume of the cone ,If its slant height is 25 cm.



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6. From a circle of radius 15cm . A sector with angle  $216^\circ$  is cut out and its bounding radius are bent so as to form a cone . Find its volume.



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7. The height of a tent is 9m. Its base diameter is 24m. What is its slant height? Find the cost

of canvas cloth required if it costs rupees 14 per sq.m.



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8. The curved surface area of a cone is  $1159\frac{5}{7}cm^2$ . Area of its base is  $254\frac{4}{7}cm^2$  Find its volume.



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**9.** A tent is cylindrical to a height of 4.8 m .and conical above it. The radius of the base is 4.5 m. and total height of the tent is 10.8 m . Find the canvas required for the tent in square meters.



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**10.** What length of tarpaulin 3 m wide will be required to make a conical tent of height 8 m and base radius 6 m ? Assume that extra



length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (use  $\pi = 3.14$ ) [Note : Take 20 cm as  $0.6 \text{ m}^2$ ]



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**11.** A Joker's cap is in the form of a right circular cone of base radius 7cm and height 27 cm. Find the area of the sheet required to make 10 such caps.



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**12.** Water is pouring into a conical vessel of diameter 5.2m. And slant height 6.8 m(as shown in the adjoining ) , at the rate of  $1.8 \text{ m}^3$  per minute .How long will it take to fill the

vessel?



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**13.** Two similar cones have volumes  $12\pi$  cu units and  $96\pi$  cu. Units. If the curved surface area of smaller cone is  $15\pi$  sq.units, what is the curved surface area of the larger one ?

Hint : For similar cones

$$\frac{r_1}{r_2} = \frac{h_1}{h_2} = \frac{I_1}{I_2} = \left(\frac{A_1}{A_2}\right)^3 = \left(\frac{V_1}{V_2}\right)^2$$



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**Exercise 10 4**

1. The radius of sphere is  $3.5\text{cm}$  Find its surface area and volume .



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2. The surface area of sphere is  $1018\frac{2}{7}$  . Sq.cm .

What is its volume?



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3. The length of equator of the globe is 44cm .

Find its surface area



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4. The diameter of a spherical ball is 21cm .

How much leather is required to prepare 5 such balls.



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5. The ratio of radii of two spheres is 2: 3. Find the ratio of their surface areas and volumes.



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6. Find the total surface area of a hemisphere of radius 10 cm . (use  $\pi = 3.14$



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7. Find the total surface area of a hemisphere of radius 10 cm . (use  $\pi = 3.14$



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8. A hemispherical bowl is made of brass .0.25 cm. thickness .The inner radius of the bowl is 5cm. Find the ratio of outer surface area to inner surface area.



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9. The diameter of a lead ball is 2.1 cm The density of the lead used is  $11.34g/c^3$  What is the weight of the ball ?



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10. A metallic cylinder of diameter 5cm. And height  $3\frac{1}{3}cm$  is melted and cast into a sphere. What is its diameter.



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**11.** How many litres of milk can a hemispherical bowl of diameter 10.5 cm . Hold ?



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**12.** A hemispherical bowl has diameter 9 cm. The liquid is poured into cylindrical bottles of diameter 3 cm and height 3 cm. If a full bowl of liquid is filled in the bottles, find how many bottles are required ?



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