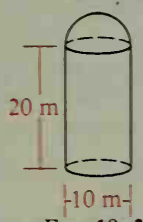
18. **a.** Find the volume, correct to the nearest cubic centimeter, of a sphere inscribed in a cube with edges 6 cm long. Use $\pi \approx 3.14$.
b. Find the volume of the region inside the cube but outside the sphere.

B

19. A silo of a barn consists of a cylinder capped by a hemisphere, as shown. Find the volume of the silo.

20. About two cans of paint are needed to cover the hemispherical dome of the silo shown. Approximately how many cans are needed to paint the rest of the silo's exterior?



Exs. 19, 20

21. An experimental one-room house is a hemisphere with a floor. If three cans of paint are needed to cover the floor, how many cans will be needed to paint the ceiling? (Ignore door and windows.)


Ex. 21

22. A hemispheric bowl with radius 25 contains water whose depth is 10. What is the area of the water's surface?

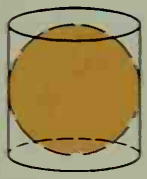
23. A solid metal ball with radius 8 cm is melted down and recast as a solid cone with the same radius.
a. What is the height of the cone?
b. Use a calculator to show that the lateral area of the cone is about 3% more than the area of the sphere.

24. Four solid metal balls fit snugly inside a cylindrical can. A geometry student claims that two extra balls of the same size can be put into the can, provided all six balls can be melted and the molten liquid poured into the can. Is the student correct? (*Hint*: Let the radius of each ball be r.)

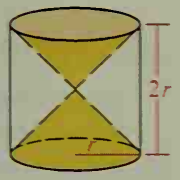

Ex. 24

25. A sphere with radius r is inscribed in a cylinder. Find the volume of the cylinder in terms of r.

26. A sphere is inscribed in a cylinder. Show that the area of the sphere equals the lateral area of the cylinder.


Exs. 25, 26

27. A double cone is inscribed in the cylinder shown. Find the volume of the space inside the cylinder but outside the double cone.



Ex. 27

28. A hollow rubber ball has outer radius 11 cm and inner radius 10 cm.
a. Find the exact volume of the rubber. Then evaluate the volume to the nearest cubic centimeter.
b. The volume of the rubber can be approximated by the formula:

$$V \approx \text{inner surface area} \cdot \text{thickness of rubber}$$

Use this formula to approximate V. Compare your answer with the answer in part (a).
c. Is the approximation method used in part (b) better for a ball with a thick layer of rubber or a ball with a thin layer?

Ex. 28