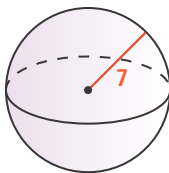




UNDERSTAND

11. **Construct Arguments** How does Cavalieri's Principle apply to finding the volume of a hemisphere? Explain.
12. **Error Analysis** Kayden is finding the surface area of the sphere. What is her error?



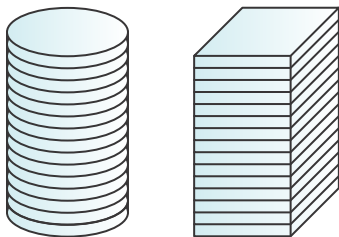
$$S.A. = 4\pi r^2$$

$$S.A. = 4 \cdot \pi \cdot 14^2$$

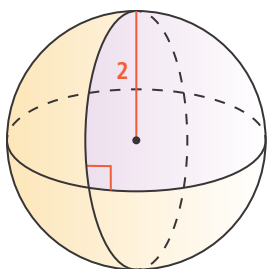
$$S.A. \approx 2,463.0 \text{ square units}$$



13. **Mathematical Connections** Given the surface area of a sphere, write a formula for the volume of a sphere in terms of the surface area.
14. **Construct Arguments** Fifteen cylinders and 15 rectangular prisms are stacked. Each cylinder has the same top surface area and height as each rectangular prism. What can you determine about the volumes of the two stacks of 15 solids? Explain.



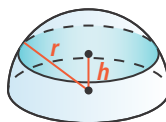
15. **Reason** A sphere is divided by two great circles that are perpendicular to each other. How would you find the surface area and volume of each part of the sphere between the two planes containing the great circles? Explain.



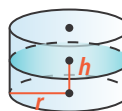
PRACTICE

For Exercises 16–18, find the area of each cross section. SEE EXAMPLE 1

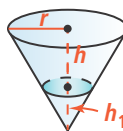
16.



17.

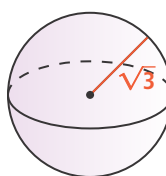


18.

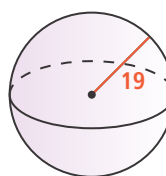


For Exercises 19–22, find the surface area of each solid to the nearest tenth. SEE EXAMPLE 2

19.



20.

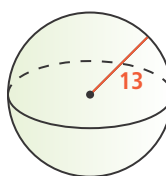


21. sphere with volume 35 cm^3

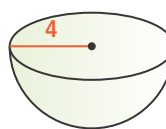
22. sphere with volume 100 in.^3

For Exercises 23–26, find the volume of each solid to the nearest tenth. SEE EXAMPLES 2 AND 3

23.



24.



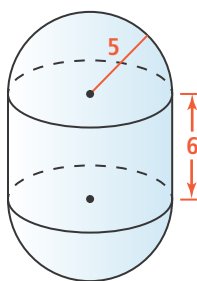
25. hemisphere with radius 12 ft

26. sphere with radius 25 m

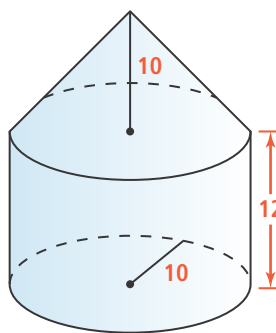
For Exercises 27 and 28, find the volume of each composite figure to the nearest tenth.

SEE EXAMPLE 4

27.



28.

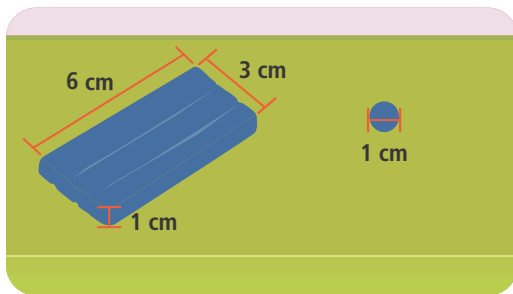


APPLY

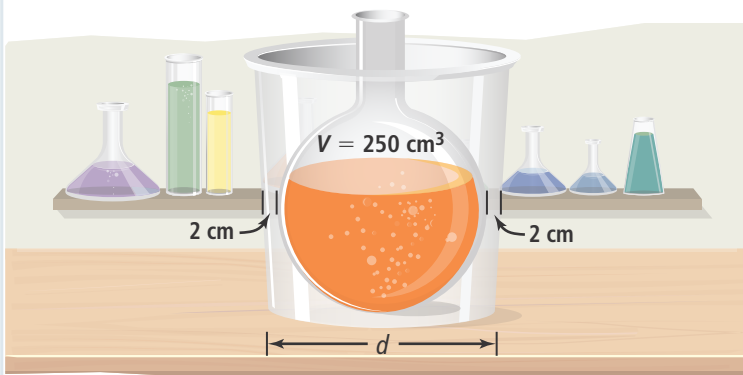
- 29. Make Sense and Persevere** To reach the regulation pressure for a game ball, the amount of air pumped into a ball is 1.54 times the volume of the ball. A referee adds 15 in.^3 of air for each pump of air. How many pumps of air will it take the referee to fill an empty ball?



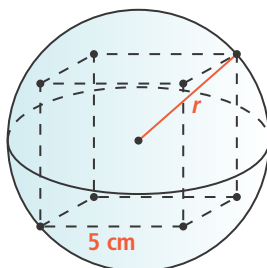
- 30. Reason** Jeffery uses a block of clay to make round beads. How many beads can he make from the block?



- 31.** Felipe places a spherical round-bottom flask in a cylindrical beaker containing hot water. The flask must fit into the beaker with 2 cm of space around the flask. What is the minimum diameter d of the beaker?



- 32. Higher Order Thinking** A company packs each wireless cube-shaped speaker in a spherical shell protected by foam. How much foam does the company use for each speaker?



ASSESSMENT PRACTICE

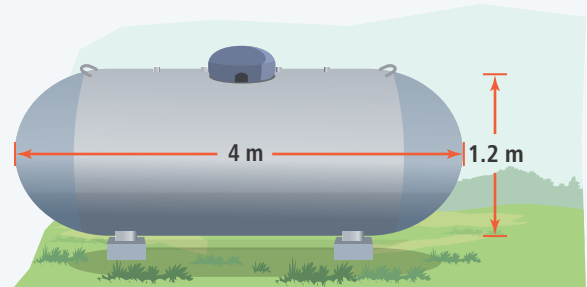
- 33.** Match each description with its expression.

- | | |
|---|----------------------|
| I. volume of a sphere with radius 1 | A. $\frac{4}{3}\pi$ |
| II. surface area of a sphere with radius 2 | B. $\frac{16}{3}\pi$ |
| III. circumference of a great circle for a sphere with radius 3 | C. 6π |
| IV. volume of a hemisphere with radius 2 | D. 16π |

- 34. SAT/ACT** The surface area of a sphere is $64\pi \text{ ft}^2$. What is the radius of the sphere?

- Ⓐ 64 ft
 Ⓑ 16 ft
 Ⓒ 8 ft
 Ⓓ 4 ft

- 35. Performance Task** Jayesh is to fill the tank shown with liquid propane.



Part A The liquid propane expands and contracts as the temperature changes, so a propane tank is never filled to more than 80% capacity with liquid propane. How much liquid propane should Jayesh put in the tank?

Part B If Jayesh has 20 m^3 of liquid propane to fill another tank. What are the dimensions of the tank if the length of the cylindrical part is three times the diameter?