

Find the surface area of the sphere with the given diameter or radius.
Leave your answer in terms of π .

← See Problem 1.

6. $d = 30$ m

7. $r = 10$ in.

8. $d = 32$ mm

9. $r = 100$ yd

Sports Find the surface area of each ball. Leave each answer in terms of π .

10.



$d = 68$ mm

11.



$d = 21$ cm

12.



$d = 2\frac{1}{16}$ in.

Use the given circumference to find the surface area of each spherical object.
Round your answer to the nearest whole number.

← See Problem 2.

13. a grapefruit with $C = 14$ cm

14. a bowling ball with $C = 27$ in.

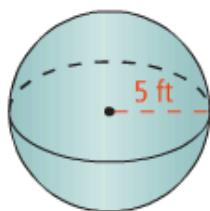
15. a pincushion with $C = 8$ cm

16. a head of lettuce with $C = 22$ in.

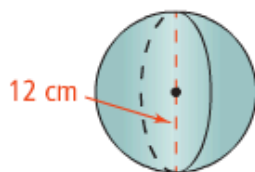
Find the volume of each sphere. Give each answer in terms of π and rounded to the nearest cubic unit.

← See Problem 3.

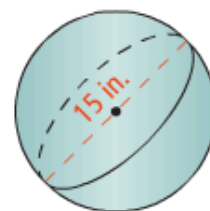
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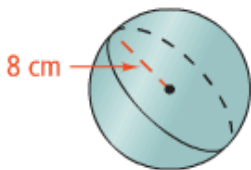
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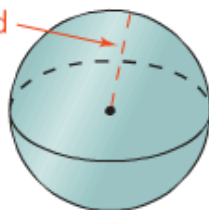
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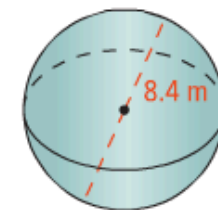
20.



21. 12 yd



22.



A sphere has the volume given. Find its surface area to the nearest whole number.

← See Problem 4.

23. $V = 900$ in.³

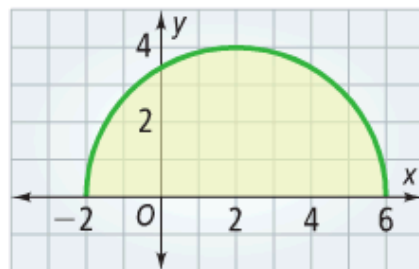
24. $V = 3000$ m³

25. $V = 140$ cm³

26. **Mental Math** Use $\pi \approx 3$ to estimate the surface area and volume of a sphere with radius 3 cm.

27. **Open-Ended** Give the dimensions of a cylinder and a sphere that have the same volume.

28. **Visualization** The region enclosed by the semicircle at the right is revolved completely about the x -axis.



- Describe the solid of revolution that is formed.
 - Find its volume in terms of π .
 - Find its surface area in terms of π .
29. **Think About a Plan** A cylindrical tank with diameter 20 in. is half filled with water. How much will the water level in the tank rise if you place a metallic ball with radius 4 in. in the tank? Give your answer to the nearest tenth.
- What causes the water level in the tank to rise?
 - Which volume formulas should you use?

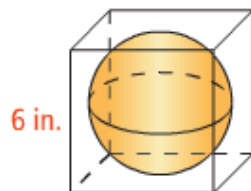
30. The sphere at the right fits snugly inside a cube with 6-in. edges. What is the approximate volume of the space between the sphere and cube?

(A) 28.3 in.³

(C) 102.9 in.³

(B) 76.5 in.³

(D) 113.1 in.³



31. **Meteorology** On September 3, 1970, a hailstone with diameter 5.6 in. fell at Coffeyville, Kansas. It weighed about 0.018 lb/in.³ compared to the normal 0.033 lb/in.³ for ice. About how heavy was this Kansas hailstone?
32. **Reasoning** Which is greater, the total volume of three spheres, each of which has diameter 3 in., or the volume of one sphere that has diameter 8 in.?
33. **Reasoning** How many great circles does a sphere have? Explain.

Find the volume in terms of π of each sphere with the given surface area.

34. $4\pi \text{ m}^2$

35. $36\pi \text{ in.}^2$

36. $9\pi \text{ ft}^2$

37. $100\pi \text{ mm}^2$

38. $25\pi \text{ yd}^2$

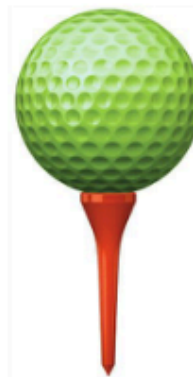
39. $144\pi \text{ cm}^2$

40. $49\pi \text{ m}^2$

41. $225\pi \text{ mi}^2$

42. **Recreation** A spherical balloon has a 14-in. diameter when it is fully inflated. Half of the air is let out of the balloon. Assume that the balloon remains a sphere.
- Find the volume of the fully inflated balloon in terms of π .
 - Find the volume of the half-inflated balloon in terms of π .
 - What is the diameter of the half-inflated balloon to the nearest inch?

- 43. Sports Equipment** The diameter of a golf ball is 1.68 in.
- Approximate the surface area of the golf ball.
 - Reasoning** Do you think that the value you found in part (a) is greater than or less than the actual surface area of the golf ball? Explain.



Geometry in 3 Dimensions A sphere has center $(0, 0, 0)$ and radius 5.

- 44.** Name the coordinates of six points on the sphere.
- 45.** Tell whether each of the following points is *inside*, *outside*, or *on the sphere*.
- $A(0, -3, 4)$
 - $B(1, -1, -1)$
 - $C(4, -6, -10)$

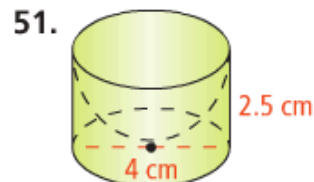
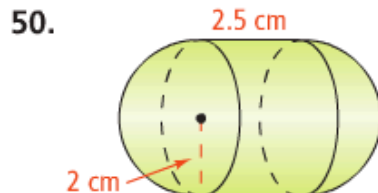
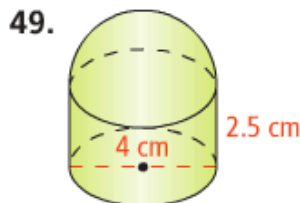
46. Food An ice cream vendor presses a sphere of frozen yogurt into a cone, as shown at the right. If the yogurt melts into the cone, will the cone overflow? Explain.

47. The surface area of a sphere is 5541.77 ft^2 . What is its volume to the nearest tenth?

48. Geography The circumference of Earth at the equator is approximately 40,075 km. About 71% of Earth is covered by oceans and other bodies of water. To the nearest thousand square kilometers, how much of Earth's surface is land?



Find the surface area and volume of each figure.



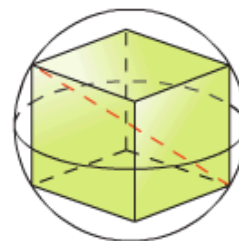
52. Astronomy The diameter of the Earth is about 24,902 mi. The diameter of the moon is about 27% of the diameter of Earth. What percent of the volume of Earth is the volume of the moon? Round your answer to the nearest whole percent.

53. Science The density of steel is about 0.28 lb/in.^3 . Could you lift a solid steel ball with radius 4 in.? With radius 6 in.? Explain.

54. A cube with edges 6 in. long fits snugly inside a sphere as shown at the right. The diagonal of the cube is the diameter of the sphere.

a. Find the length of the diagonal and the radius of the sphere. Leave your answer in simplest radical form.

b. What is the volume of the space between the sphere and the cube to the nearest tenth?



e Find the radius of a sphere with the given property.

55. The number of square meters of surface area equals the number of cubic meters of volume.

56. The ratio of surface area in square meters to volume in cubic meters is 1 : 5.