

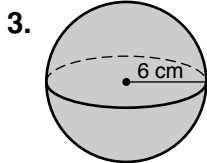
**LESSON**  
**10-8**

**Practice A**  
**Spheres**

Write each formula.

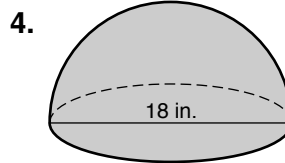
1. volume of a sphere with radius  $r$  \_\_\_\_\_
2. surface area of a sphere with radius  $r$  \_\_\_\_\_

Find each measurement. Give your answers in terms of  $\pi$ .



the volume of the sphere

\_\_\_\_\_

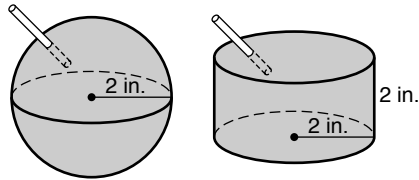


the volume of the hemisphere

\_\_\_\_\_

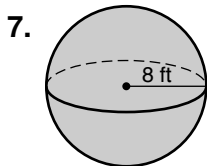
5. the radius of a sphere with a volume of  $36,000\pi \text{ mm}^3$  \_\_\_\_\_

6. Margot is thirsty after a 5-km run for charity. The organizers offer the containers of water shown in the figure. Margot wants the one with the greater volume of water. Tell which container Margot should pick.



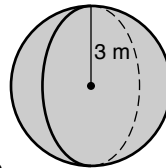
\_\_\_\_\_

Find the surface area of each sphere. Give your answers in terms of  $\pi$ .



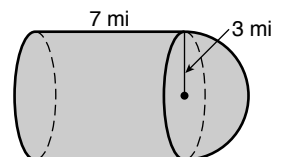
8. the surface area of a sphere with volume  $\frac{256\pi}{3} \text{ yd}^3$
- \_\_\_\_\_

Complete Exercises 9–11 to describe the effect on the volume and the surface area of multiplying the radius of a sphere by 3.



9. Find the volume and surface area of the sphere. \_\_\_\_\_
10. Find the volume and surface area of the sphere after the radius is multiplied by 3. \_\_\_\_\_
11. Describe the effect on the volume and surface area of multiplying the radius of the sphere by 3. \_\_\_\_\_

12. Find the volume and surface area of the composite figure. Give your answers in terms of  $\pi$ .
- \_\_\_\_\_



**LESSON**  
**10-3** **Practice A**  
**Spheres**

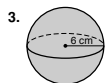
Write each formula.

- volume of a sphere with radius  $r$
- surface area of a sphere with radius  $r$

$$V = \frac{4}{3}\pi r^3$$

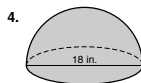
$$S = 4\pi r^2$$

Find each measurement. Give your answers in terms of  $\pi$ .



the volume of the sphere

$$V = 288\pi \text{ cm}^3$$



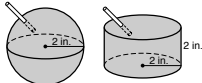
the volume of the hemisphere

$$V = 486\pi \text{ in}^3$$

- the radius of a sphere with a volume of  $36,000\pi \text{ mm}^3$

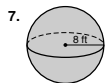
$$r = 30 \text{ mm}$$

- Margot is thirsty after a 5-km run for charity. The organizers offer the containers of water shown in the figure. Margot wants the one with the greater volume of water. Tell which container Margot should pick.



the sphere

Find the surface area of each sphere. Give your answers in terms of  $\pi$ .



$$S = 256\pi \text{ ft}^2$$

- the surface area of a sphere with volume  $\frac{256\pi}{3} \text{ yd}^3$

$$S = 64\pi \text{ yd}^2$$

Complete Exercises 9–11 to describe the effect on the volume and the surface area of multiplying the radius of a sphere by 3.

- Find the volume and surface area of the sphere.
- Find the volume and surface area of the sphere after the radius is multiplied by 3.
- Describe the effect on the volume and surface area of multiplying the radius of the sphere by 3.



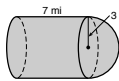
$$V = 36\pi \text{ m}^3; S = 36\pi \text{ m}^2$$

$$V = 972\pi \text{ m}^3; S = 324\pi \text{ m}^2$$

The volume is multiplied by 27. The surface area is multiplied by 9.

- Find the volume and surface area of the composite figure. Give your answers in terms of  $\pi$ .

$$V = 81\pi \text{ mi}^3; S = 69\pi \text{ mi}^2$$



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Holt Geometry

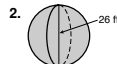
**LESSON**  
**10-3** **Practice B**  
**Spheres**

Find each measurement. Give your answers in terms of  $\pi$ .



the volume of the hemisphere

$$V = 3888\pi \text{ mm}^3$$



the volume of the sphere

$$V = \frac{8788\pi}{3} \text{ ft}^3 = 2929\frac{1}{3}\pi \text{ ft}^3$$

- the diameter of a sphere with volume  $\frac{500\pi}{3} \text{ m}^3$

$$d = 10 \text{ m}$$

- The figure shows a grapefruit half. The radius to the outside of the rind is 5 cm. The radius to the inside of the rind is 4 cm. The edible part of the grapefruit is divided into 12 equal sections. Find the volume of the half grapefruit and the volume of one edible section. Give your answers in terms of  $\pi$ .



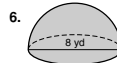
$$V = \frac{250\pi}{3} \text{ cm}^3; V = \frac{32\pi}{9} \text{ cm}^3$$

Find each measurement. Give your answers in terms of  $\pi$ .



the surface area of the sphere

$$S = 484\pi \text{ in}^2$$



the surface area of the closed hemisphere and its circular base

$$S = 48\pi \text{ yd}^2; S = 16\pi \text{ yd}^2$$

- the volume of a sphere with surface area  $196\pi \text{ km}^2$

$$V = \frac{1372\pi}{3} \text{ km}^3 = 457\frac{1}{3}\pi \text{ km}^3$$

Describe the effect of each change on the given measurement of the figure.



surface area

The dimensions are divided by 4.

The surface area is divided by 16.



volume

The dimensions are multiplied by  $\frac{2}{5}$ .

The volume is multiplied by  $\frac{8}{125}$ .

Find the surface area and volume of each composite figure. Round to the nearest tenth.



$$S \approx 271.6 \text{ in}^2; V \approx 234.8 \text{ in}^3$$



$$S \approx 446.0 \text{ cm}^2; V \approx 829.4 \text{ cm}^3$$

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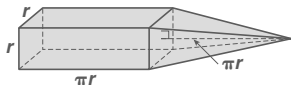
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Holt Geometry

**LESSON**  
**10-3** **Practice C**  
**Spheres**

- A sphere has radius  $r$ . Draw a composite figure made up of a square prism (not a cube) and a square pyramid that has the same volume as the sphere.

Possible answer:



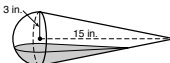
- Find the surface area of the composite figure you drew in Exercise 1.

$$\text{Possible answer: } S = 4\pi r^2 + r^2 + r^2\sqrt{4\pi^2 + 1}$$

- Consider a composite figure made up of a cylinder and a cone that has the same volume as a sphere with radius  $r$ . Find the figure's surface area.

$$S = 3\pi r^2 + \pi r^2\sqrt{2}$$

Use the figure for Exercises 4–6. The figure shows a hollow, sealed container with some water inside.



$$h \approx 11.1 \text{ in.}$$

- There is just enough water in the container to exactly fill the hemisphere. The container is held so that the point of the cone is down and the altitude of the cone is exactly vertical. Find the height of the water in the container. Round to the nearest tenth.

$$h \approx 6.9 \text{ in.}$$

- Find the height of the cone with the same radius if the container were made so that the water would exactly fill either the hemisphere or the cone.

$$h = 6 \text{ in.}$$

- A sphere has center  $(0, 0, 0)$ . Its surface passes through the point  $(x, y, z)$ . Find the sphere's surface area and volume.

$$S = 4\pi(x^2 + y^2 + z^2); V = \frac{4}{3}\pi(x^2 + y^2 + z^2)^{3/2}$$

Use the figure for Exercises 8–10. The figure shows a can of three tennis balls. The can is just large enough so that the tennis balls will fit inside with the lid on. The diameter of each tennis ball is 2.5 in. Give exact fraction answers.



- Find the total volume of the can.
- Find the volume of empty space inside the can.
- Tell what percent of the can is occupied by the tennis balls.

$$V = \frac{375\pi}{32} \text{ in}^3$$

$$V = \frac{125\pi}{32} \text{ in}^3$$

$$66\frac{2}{3}\%$$

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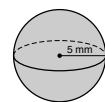
Holt Geometry

**LESSON**  
**10-8** **Reteach**  
**Spheres**

Volume and Surface Area of a Sphere		
Volume	The volume of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$ .	
Surface Area	The surface area of a sphere with radius $r$ is $S = 4\pi r^2$ .	

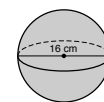
Find each measurement. Give your answer in terms of  $\pi$ .

- the volume of the sphere



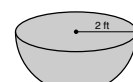
$$V = \frac{500\pi}{3} \text{ mm}^3$$

- the volume of the sphere



$$V = \frac{2048\pi}{3} \text{ cm}^3$$

- the volume of the hemisphere

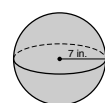


$$V = \frac{16\pi}{3} \text{ ft}^3$$

- the radius of a sphere with volume  $7776\pi \text{ in}^3$

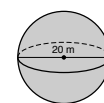
$$r = 18 \text{ in.}$$

- the surface area of the sphere



$$S = 196\pi \text{ in}^2$$

- the surface area of the sphere



$$S = 400\pi \text{ m}^2$$

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