Name_____ Date _____

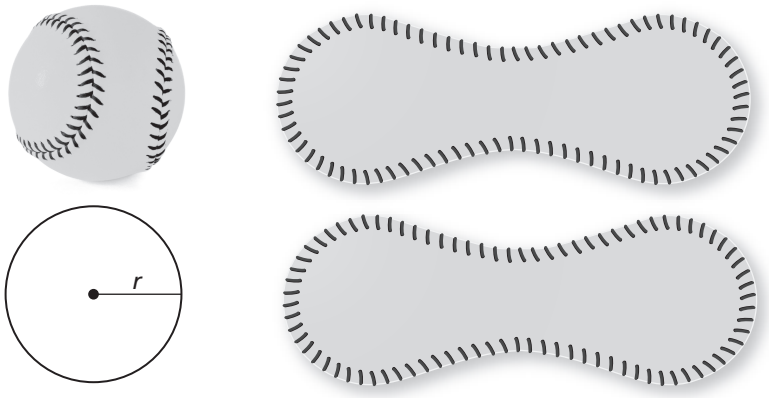
11.8 Surface Areas and Volumes of Spheres

For use with Exploration 11.8

Essential Question How can you find the surface area and the volume of a sphere?

1 EXPLORATION: Finding the Surface Area of a Sphere

Work with a partner. Remove the covering from a baseball or softball.



You will end up with two "figure 8" pieces of material, as shown above. From the amount of material it takes to cover the ball, what would you estimate the surface area S of the ball to be? Express your answer in terms of the radius r of the ball.

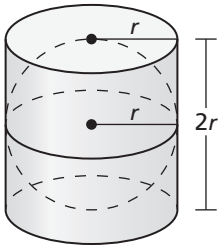
$S =$ _____ Surface area of a sphere

Use the Internet or some other resource to confirm that the formula you wrote for the surface area of a sphere is correct.

Name _____ Date _____

2 EXPLORATION: Finding the Volume of a Sphere

Work with a partner. A cylinder is circumscribed about a sphere, as shown. Write a formula for the volume V of the cylinder in terms of the radius r.



V = _____ Volume of cylinder

When half of the sphere (a *hemisphere*) is filled with sand and poured into the cylinder, it takes three hemispheres to fill the cylinder. Use this information to write a formula for the volume V of a sphere in terms of the radius r

V = _____ Volume of a sphere

Communicate Your Answer

3. How can you find the surface area and the volume of a sphere?

4. Use the results of Explorations 1 and 2 to find the surface area and the volume of a sphere with a radius of (a) 3 inches and (b) 2 centimeters.

Name_____ Date _____

11.8 Notetaking with Vocabulary

For use after Lesson 11.8

In your own words, write the meaning of each vocabulary term.

chord of a sphere

great circle

Core Concepts

Surface Area of a Sphere

The surface area S of a sphere is

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

where r is the radius of the sphere.

$S = 4\pi r^2$

Notes:

Name _____ Date _____

11.8 Notetaking with Vocabulary (continued)

Volume of a Sphere

The volume V of a sphere is

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

where r is the radius of the sphere.

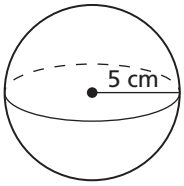
$V = \frac{4}{3}\pi r^3$

Notes:

Extra Practice

In Exercises 1–4, find the surface area of the solid.

1.



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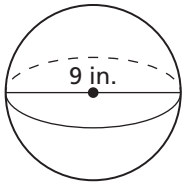

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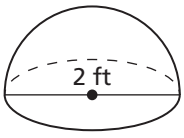

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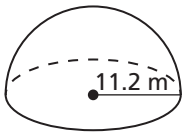
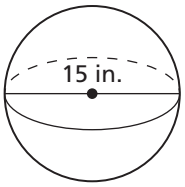


Name_____ Date _____

11.8 Notetaking with Vocabulary (continued)

In Exercises 5–8, find the volume of the sphere.

5.



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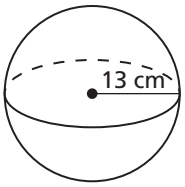

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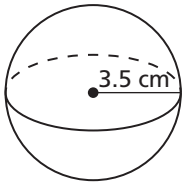

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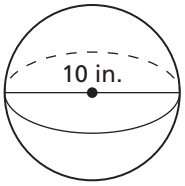

In Exercises 9–11, find the indicated measure.

9. Find the diameter of a sphere with a surface area of 144π square centimeters.

10. Find the volume of a sphere with a surface area of 256π square inches.

11. Find the volume of a sphere with a surface area of 400π square feet.