

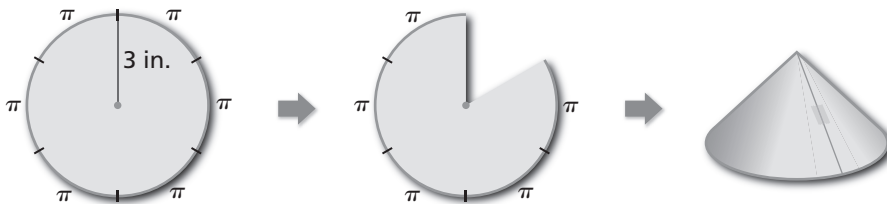
**11.7****Surface Areas and Volumes of Cones**

For use with Exploration 11.7

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

**1 EXPLORATION: Finding the Surface Area of a Cone**

**Work with a partner.** Construct a circle with a radius of 3 inches. Mark the circumference of the circle into six equal parts, and label the length of each part. Then cut out one sector of the circle and make a cone.

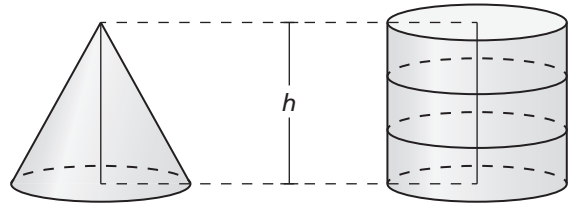


- Explain why the base of the cone is a circle. What are the circumference and radius of the base?
- What is the area of the original circle? What is the area with one sector missing?
- Describe the surface area of the cone, including the base. Use your description to find the surface area.

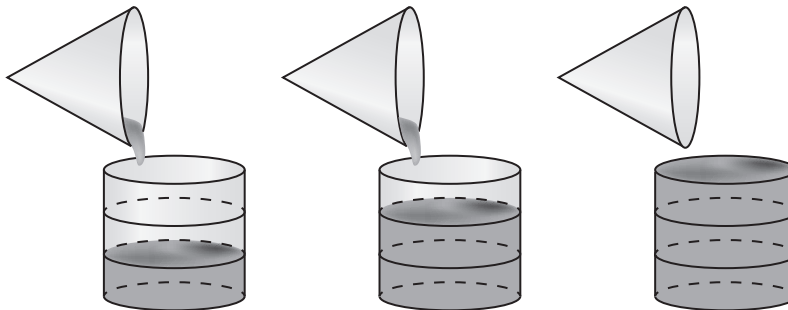
**11.7** Surface Areas and Volumes of Cones (continued)

**2** **EXPLORATION:** Finding the Volume of a Cone

**Work with a partner.** The cone and the cylinder have the same height and the same circular base.



When the cone is filled with sand and poured into the cylinder, it takes three cones to fill the cylinder.



Use this information to write a formula for the volume  $V$  of a cone.

**Communicate Your Answer**

3. How can you find the surface area and the volume of a cone?
  
4. In Exploration 1, cut another sector from the circle and make a cone. Find the radius of the base and the surface area of the cone. Repeat this three times, recording your results in a table. Describe the pattern.

Radius of Base	Surface Area of Cone

**11.7****Notetaking with Vocabulary**

For use after Lesson 11.7

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

lateral surface of a cone

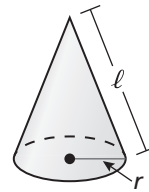
**Notes:**

**Core Concepts****Surface Area of a Right Cone**

The surface area  $S$  of a right cone is

$$S = \pi r^2 + \pi r \ell$$

where  $r$  is the radius of the base and  $\ell$  is the slant height.

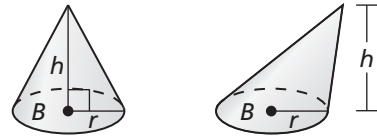


**Notes:**

**11.7** Notetaking with Vocabulary (continued)**Volume of a Cone**

The volume  $V$  of a cone is

$$V = \frac{1}{3}Bh = \frac{1}{3}\pi r^2h$$

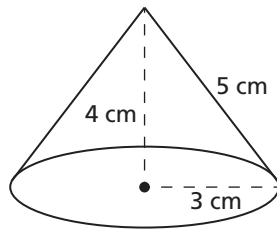


where  $B$  is the area of a base,  $h$  is the height, and  $r$  is the radius of the base.

**Notes:****Extra Practice**

In Exercises 1 and 2, find the surface area of the right cone.

1.

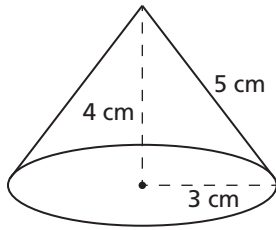


2. A right cone has a diameter of 1.8 inches and a height of 3 inches.

**11.7** Notetaking with Vocabulary (continued)

In Exercises 3 and 4, find the volume of the cone.

3.



4. A right cone has a radius of 5 feet and a slant height of 13 feet.

In Exercises 5–7, find the indicated measure.

5. A right cone has a surface area of 440 square inches and a radius of 7 inches. Find its slant height.

6. A right cone has a volume of 528 cubic meters and a diameter of 12 meters. Find its height.

7. Cone A and cone B are similar. The radius of cone A is 4 cm and the radius of cone B is 10 cm. The volume of cone A is  $134 \text{ cm}^3$ , find the volume of cone B.

8. Find the volume of the composite solid.

