LESSON 12.7

NAME _____ DATE _____

# Reteaching with Practice

**For use with pages 766–772**

**GOAL** **Find and use the scale factor of similar solids and use similar solids to solve problems**

## VOCABULARY

Two solids with equal ratios of corresponding linear measures, such as heights or radii, are called **similar solids**.

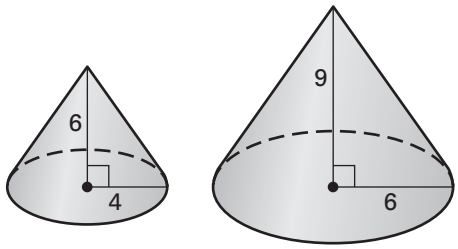
The common ratio of linear measures for a pair of similar solids is called the **scale factor** of one solid to the other solid.

**Theorem 12.13 Similar Solids Theorem** If two similar solids have a scale factor of $a:b$, then corresponding areas have a ratio of $a^2:b^2$, and corresponding volumes have a ratio of $a^3:b^3$.

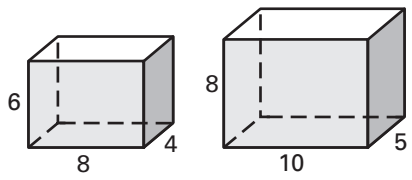
## EXAMPLE 1 *Identifying Similar Solids*

Decide whether the two solids are similar. If so, find the scale factor.

**a.**




**b.**




### SOLUTION

**a.** The solids are similar because the ratios of corresponding linear measures are equal, as shown.

radii: $\frac{4}{6} = \frac{2}{3}$ heights: $\frac{6}{9} = \frac{2}{3}$

The solids have a scale factor of 2:3.

**b.** The solids are not similar because the ratios of corresponding linear measures are not equal, as shown.

widths: $\frac{4}{5}$ lengths: $\frac{8}{10} = \frac{4}{5}$ heights: $\frac{6}{8} = \frac{3}{4}$

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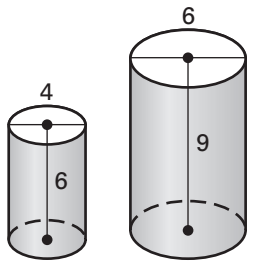
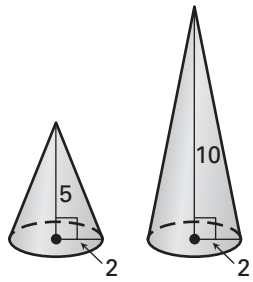
## Exercises for Example 1

**Decide whether the two solids are similar. If so, find the scale factor.**

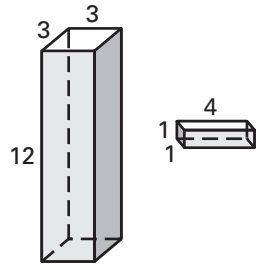
**1.**




**2.**

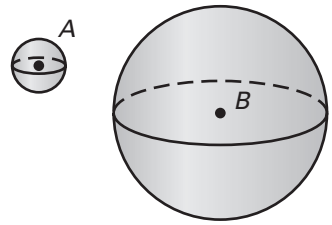



**3.**




## EXAMPLE 2 Using the Scale Factor of Similar Solids

The spheres are similar with a scale factor of 1:4. Find the surface area and volume of sphere $B$ given that the surface area of sphere $A$ is $144\pi$ square inches and the volume of sphere $A$ is $288\pi$ cubic inches.




### SOLUTION

Begin by using Theorem 12.13 to set up two proportions.

$$\frac{\text{Surface area of } A}{\text{Surface area of } B} = \frac{a^2}{b^2} \qquad \frac{\text{Volume of } A}{\text{Volume of } B} = \frac{a^3}{b^3}$$

$$\frac{144\pi}{\text{Surface area of } B} = \frac{1^2}{4^2} \qquad \frac{288\pi}{\text{Volume of } B} = \frac{1^3}{4^3}$$

$$\text{Surface area of } B = 2304\pi \qquad \text{Volume of } B = 18{,}432\pi$$

So, the surface area of sphere $B$ is $2304\pi$ square inches and the volume of sphere $B$ is $18{,}432\pi$ cubic inches.

## Exercises for Example 2

**The solid described is similar to a larger solid with the given scale factor. Find the surface area $S$ and volume $V$ of the larger solid.**

**4.** A right cylinder with a surface area of $48\pi$ square centimeters and a volume of $45\pi$ cubic centimeters; scale factor 2:3

**5.** A right prism with a surface area of 82 square feet and a volume of 42 cubic feet; scale factor 1:2