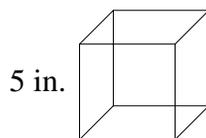
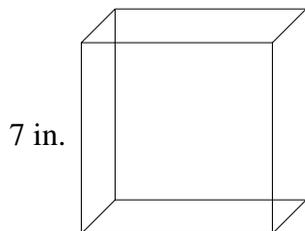


Using Similar Solids

For each pair of similar solids, find the scale factor of the solid on the left to the solid on the right. Then find the ratios of the surface areas and the ratio of the volumes.

1.

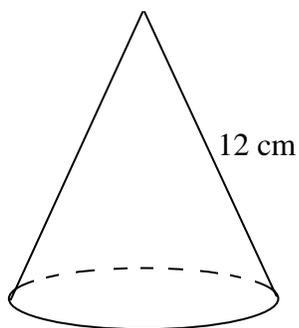
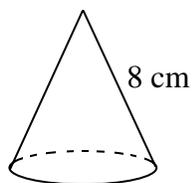


scale factor:

ratio of surface areas:

ratio of volumes:

2.

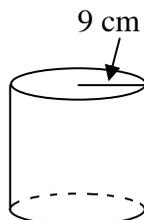
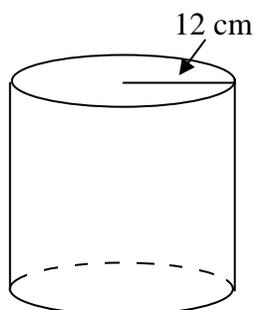


scale factor:

ratio of surface areas:

ratio of volumes:

3.

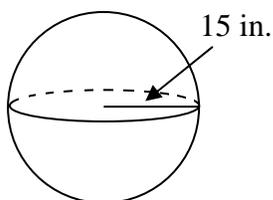
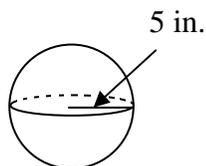


scale factor:

ratio of surface areas:

ratio of volumes:

4.



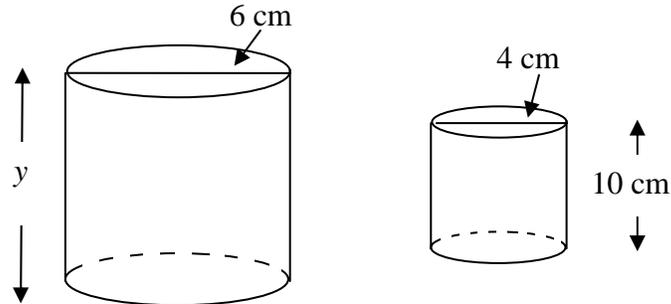
scale factor:

ratio of surface areas:

ratio of volumes:

Using Similar Solids (Continued)

5. Look at the two cylinders shown below. The ratio of corresponding diameters is equal to the ratio of the corresponding heights.



- a. What is the height of the large cylinder? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- b. Find the ratio of the volumes of the cylinders. Use mathematics to justify your answer.
6. The ratio of the volumes of two tetrahedrons is 1000:1. The smaller tetrahedron has a side length of 8 centimeters. What is the side length of the larger tetrahedron? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
7. Suppose that all pizzas have the same thickness and the cost and number of servings both depend only on the surface area. A pizza 10 inches in diameter costs \$8.12 and serves 2 people.
- a. How much should a 14-inch pizza cost? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- b. How many people would the 14-inch pizza serve? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
8. A trophy that is 8 inches tall weighs 4 pounds. A trophy of similar shape is 12 inches tall. How much does the larger trophy weigh? Assume that the weight is proportional to the volume in any solid. Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

- Answers:
1. scale factor: $\frac{7}{5}$
ratio of surface areas: $\frac{49}{25}$
ratio of volumes: $\frac{343}{125}$
 2. scale factor: $\frac{8}{12}$ or $\frac{2}{3}$
ratio of surface areas: $\frac{64}{144}$ or $\frac{4}{9}$
ratio of volumes: $\frac{512}{1728}$ or $\frac{8}{27}$
 3. scale factor: $\frac{12}{9}$ or $\frac{3}{4}$
ratio of surface areas: $\frac{144}{81}$ or $\frac{16}{9}$
ratio of volumes: $\frac{1728}{729}$ or $\frac{64}{27}$
 4. scale factor: $\frac{5}{15}$ or $\frac{1}{3}$
ratio of surface areas: $\frac{25}{225}$ or $\frac{1}{9}$
ratio of volumes: $\frac{125}{3375}$ or $\frac{1}{27}$
 5. a. $\frac{6}{4} = \frac{y}{10}$
 $4y = 60$
 $y = 15$ cm
 - b. scale factor is $\frac{3}{2}$; The ratio of the volumes is the scale factor cubed so ratio of the volumes is $\frac{3^3}{2^3} = \frac{27}{8}$.
 6. Volume ratio is $\frac{1000}{1}$, so the side ratio is $\sqrt[3]{\frac{1000}{1}} = \frac{10}{1}$
 $\frac{10}{1} = \frac{x}{8}$, so $x = 80$ cm

7. a. $\left(\frac{10}{14}\right)^2 = \frac{8.12}{c}$
 $100c = 1591.52$
 $c = 15.9152$ cost should be \$15.92
- b. $\left(\frac{10}{14}\right)^2 = \frac{2}{p}$
 $100p = 392$
 $p = 3.92$ almost 4 people
8. $\left(\frac{8}{12}\right)^3 = \frac{4}{x}$
 $512x = 6912$
 $x = 13.5$ The larger trophy will weigh about 13.5 pounds.