Name: _____

Write your questions here!

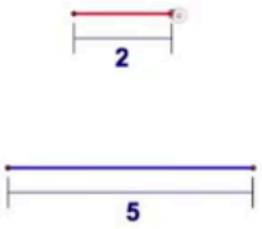
6.6 SA and V of Similar Solids

THEOREM 12.13 Similar Solids Theorem

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

ratio of lengths

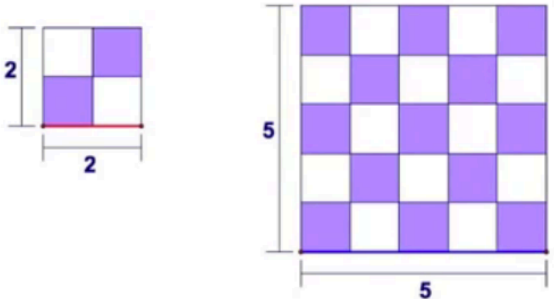
_____ : _____



ratio of areas

_____ : _____

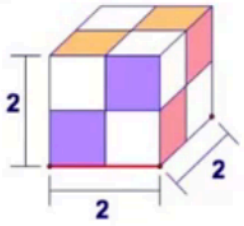
_____ : _____

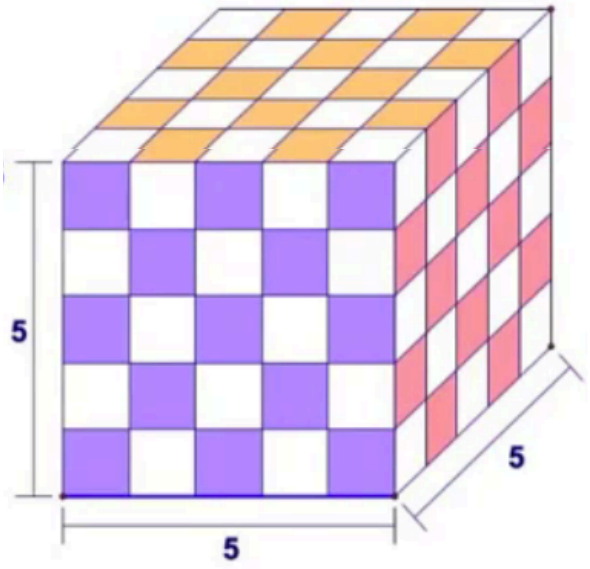


ratio of volumes

_____ : _____

_____ : _____

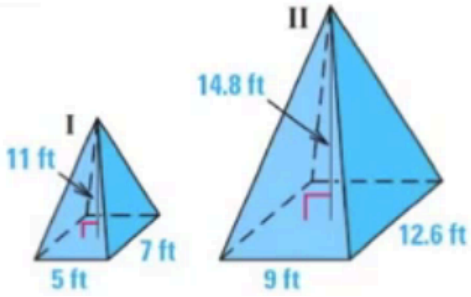




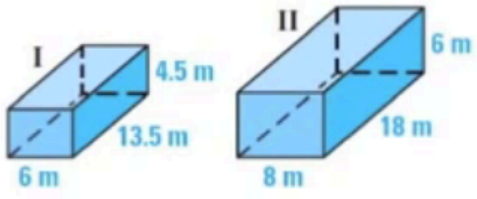
IDENTIFYING SIMILAR SOLIDS

12.6 Exercise # 4 & 5

4.



5.

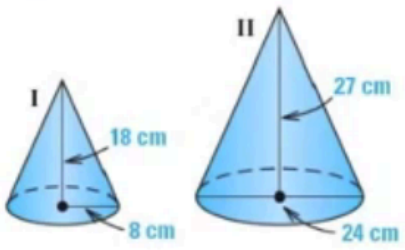


Write your questions here!

IDENTIFYING SIMILAR SOLIDS

12.6 Exercise

Tell whether the pair of right solids is similar. Explain your reasoning.

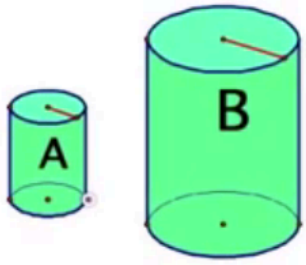


$$\frac{r_1}{r_2} = \frac{h_1}{h_2}$$

USING SCALE FACTOR

Solid A is similar to solid B by a scale factor of 1:2. Find the surface area and the volume of Solid B.

Scale factor of 1:2

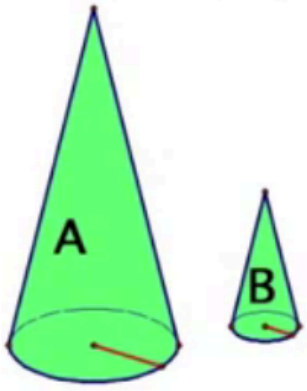


$S_A = 150\pi \text{ in}^2$
$V_A = 250\pi \text{ in}^3$

USING SCALE FACTOR

Solid A is similar to solid B by a scale factor of 5:2. Find the surface area and the volume of Solid B.

Scale factor of 5:2



$S_A = 2356.2 \text{ cm}^2$
$V_A = 7450.9 \text{ cm}^3$

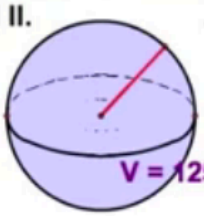
Write your questions here!

FINDING SCALE FACTOR

In Exercise12 and 14, Solid I is similar to Solid II. Find the scale factor of Solid I to Solid II.

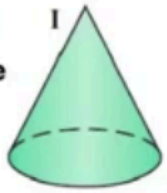
12.6 Exercise # 12 & 14

V = 8π ft³



V = 125π ft³

14.



$S = 288\ cm^2$

$S = 128\ cm^2$

$$\frac{V_I}{V_{II}} \qquad \frac{S_I}{S_{II}}$$

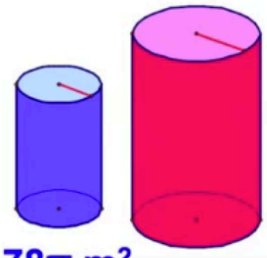
FINDING A RATIO Two spheres have volumes of 2π cubic feet and 16π cubic feet. What is the ratio of the surface area of the smaller sphere to the surface area of the larger sphere

12.6 Exercise # 17

FINDING SURFACE AREA

Two similar cylinders have a scale factor of 2:3. The smaller cylinder has a surface area of 78π square meters. Find the surface area of the larger cylinder.

Scale factor of 2:3



78π m²

Now, summarize your notes here!

6.6 SA and V of Similar Solids Problem Set

Vocabulary and Concept Check

Help with H
BigIdea

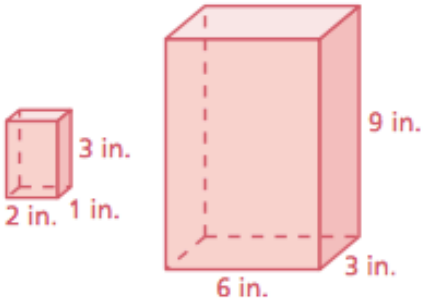
1. **VOCABULARY** What are similar solids?
2. **OPEN-ENDED** Draw two similar solids and label their corresponding linear measures.
3. **REASONING** The ratio of the corresponding linear measures of Cube A to Cube B is $\frac{2}{3}$.
   - **a.** Find the ratio of the area of one face of Cube A to the area of one face of Cube B.
   - **b.** Find the ratio of the volume of Cube A to the volume of Cube B.

Practice and Problem Solving

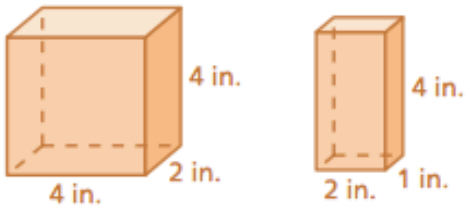
Determine whether the solids are similar.

1

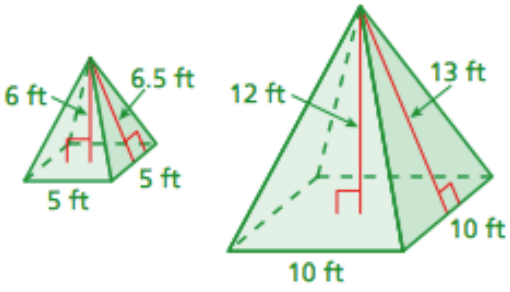
4.



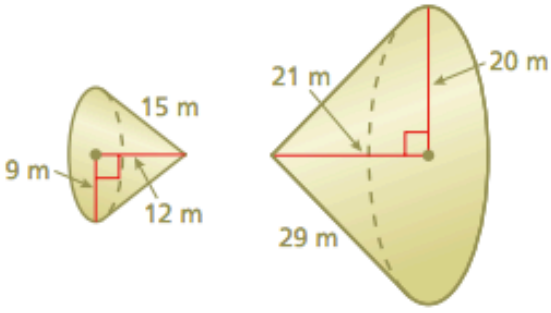
5.



6.



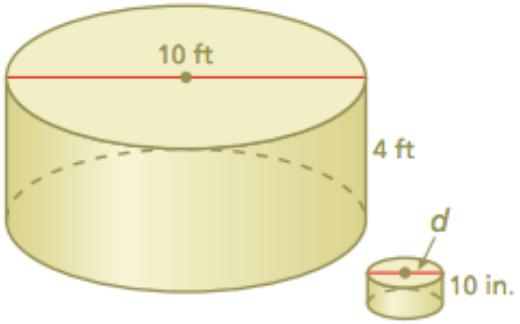
7.



The solids are similar. Find the missing dimension(s).

2

8.



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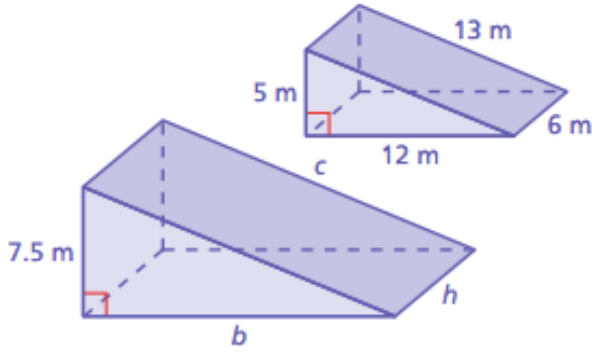
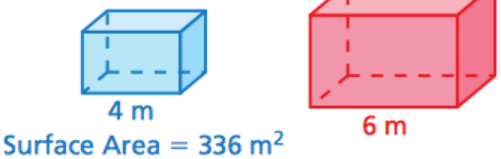


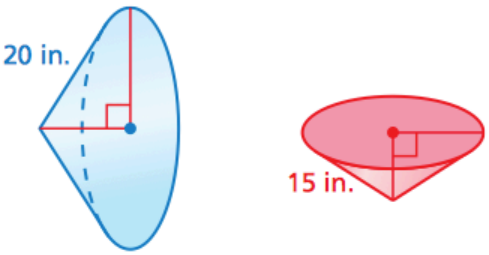
The solids are similar. Find the surface area S or volume V of the red solid. Round your answer to the nearest tenth.

3 4 **10.**



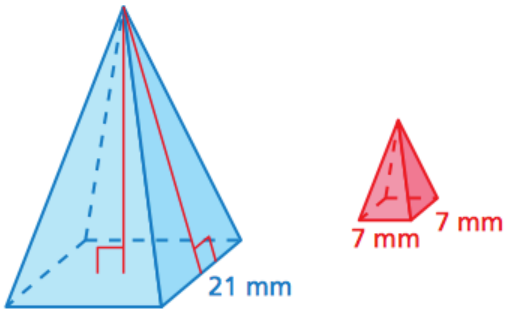
Surface Area = 336 m^2

11.



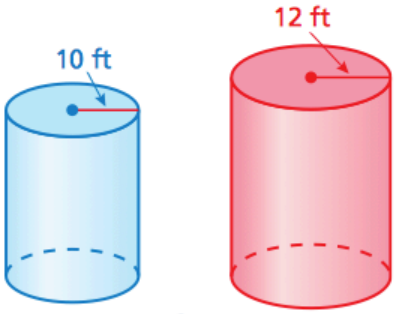
Surface Area = 1800 $in.^2$

12.



Volume = 5292 mm^3

13.



Volume = 7850 ft^3

14. ERROR ANALYSIS The ratio of the corresponding linear measures of two similar solids is 3 : 5. The volume of the smaller solid is 108 cubic inches. Describe and correct the error in finding the volume of the larger solid.

✗

$$\frac{108}{V} = \left(\frac{3}{5}\right)^2$$

$$\frac{108}{V} = \frac{9}{25}$$

$$300 = V$$

The volume of the larger solid is 300 cubic inches.

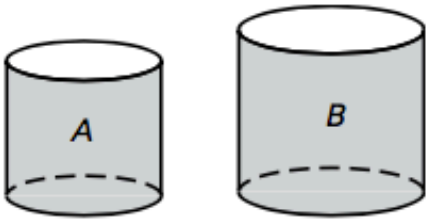
15. MIXED FRUIT The ratio of the corresponding linear measures of two similar cans of fruit is 4 to 7. The smaller can has a surface area of 220 square centimeters. Find the surface area of the larger can.

16. The cans shown are similar with a scale factor of 87:100**. Find the surface area and volume of the larger can.**

$S = 51.84$ $in.^2$
$V = 28.27$ $in.^3$

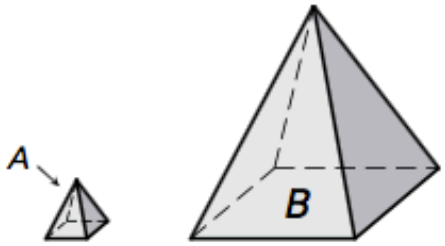
Solid A is similar to Solid B. Find the scale factor of Solid A to Solid B.

16.



$S = 75\ cm^2$ $S = 108\ cm^2$

17.



$S = 12\ ft^2$ $S = 192\ ft^2$

SKILLZ REVIEW

Tina wants to sew a piece of fabric into a scarf in the shape of an isosceles triangle, as shown in the accompanying diagram.

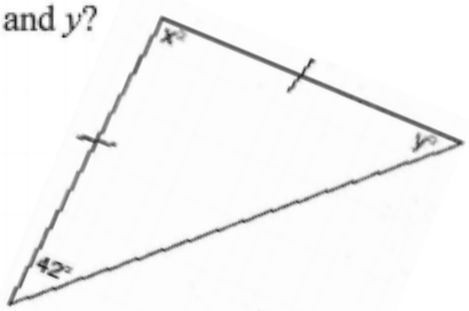
What are the values of x and y?

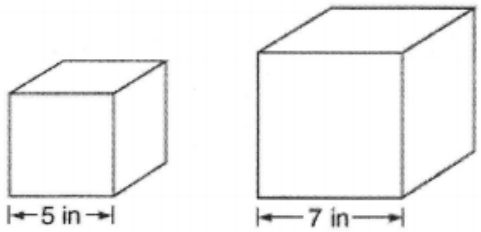
[A] $x = 96$ and $y = 42$

[B] $x = 42$ and $y = 96$

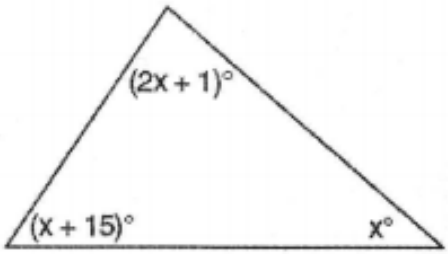
[C] $x = 69$ and $y = 69$

[D] $x = 90$ and $y = 48$





What is the measure of the largest angle in the accompanying triangle?



[A] 83 [B] 46.5 [C] 41 [D] 56

Tracey has two empty cube-shaped containers with sides of 5 inches and 7 inches, as shown in the accompanying diagram. She fills the smaller container completely with water and then pours all the water from the smaller container into the larger container. How deep, to the *nearest tenth of an inch*, will the water be in the larger container?

6.6 SA and V of Similar Solids Applications

1. **Multiple Choice** The scale factor of two similar solids is 2 : 5. The volume of the smaller Solid A is 200π. Which equation could you use to find the volume of the larger Solid B?

A. $\frac{200\pi}{\text{Volume of B}} = \frac{2^2}{5^2}$

B. $\frac{200\pi}{\text{Volume of B}} = \frac{5^3}{2^3}$

C. $\frac{200\pi}{\text{Volume of B}} = \frac{2}{5}$

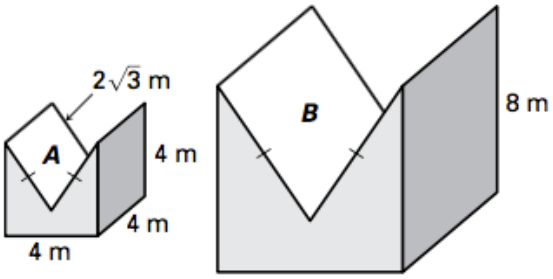
D. $\frac{200\pi}{\text{Volume of B}} = \frac{2^3}{5^3}$

2. **CLASSIC MUSTANG** The volume of a 1968 Ford Mustang GT engine is 390 cubic inches. Which scale model of the Mustang has the greater engine volume, a 1 : 18 scale model or a 1 : 24 scale model? How much greater?

3. A store sells balls of yarn in two different sizes. The diameter of the larger ball is twice the diameter of the smaller ball. If the balls of yarn cost $7.50 and $1.50, respectively, which ball of yarn is the better buy?

Solid A is similar to Solid B. Find the surface area and volume of Solid B.

4.



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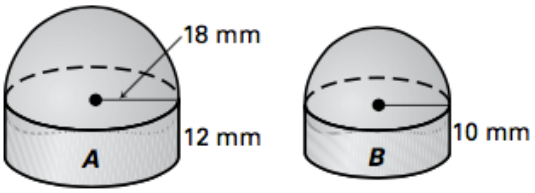
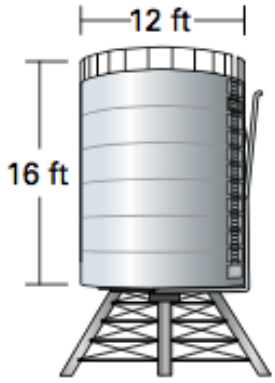


6. **Water Tower** As part of a class project, you obtain the responsibility of making a scale model of the water tower in your town. The water tower's diameter is 12 feet and the height is 16 feet. You decide that 0.5 inch in your model will correspond to 12 inches of the actual water tower.



What is the scale factor?

What is the radius and height of the model?

What is the surface area of the model?

What is the volume of the actual water tower?

7. Two similar rectangular prisms have surface areas 640 square millimeters and 40 square millimeters. What is the scale factor of the larger prism to the smaller prism?

Determine whether the statement is true or false.

8.	**T or F**	Two cones with the same height are always similar.
9.	**T or F**	A cylinder can be similar to a sphere.
10.	**T or F**	Doubling the radius of a sphere doubles its surface area.
11.	**T or F**	Doubling the side length of a cube doubles its volume.