Name _____ Date _____ Class _____

# Additional Practice

Investigation 5

**Filling and Wrapping**

**1.** A closed rectangular box has a height of 2 feet, a length of 4 feet, and a width of 4 feet.

**a.** What is the volume of the box? What is the surface area of the box?

**b.** Give the dimensions of a closed rectangular box that has one-fourth the volume of this 2-4-4 box, and give the surface area of this smaller box.

**c.** What is the ratio of the surface area of the 2-4-4 box to the surface area of the box you found in part (b)?

**2.** Lee built a box with a volume equal to 8 times the volume of a 2-1-5 box.

**a.** What might be the dimensions of Lee's box?

**b.** Is your answer to part (a) the only possibility for the dimensions of the larger box? Explain your reasoning.

**3.** A cone has a height of 12 centimeters and a base with a radius of 4 centimeters.

**a.** The cone is scaled down to a similar cone with one-eighth of the original volume. What are the dimensions of the scaled-down cone?

**b.** Is your answer to part (a) the only possibility for the dimensions of the scaled-down cone? Explain your reasoning.

**4. a.** How does the volume of a sphere with a radius of 4 centimeters compare to the volume of a sphere with a radius of 6 centimeters? Explain your reasoning.

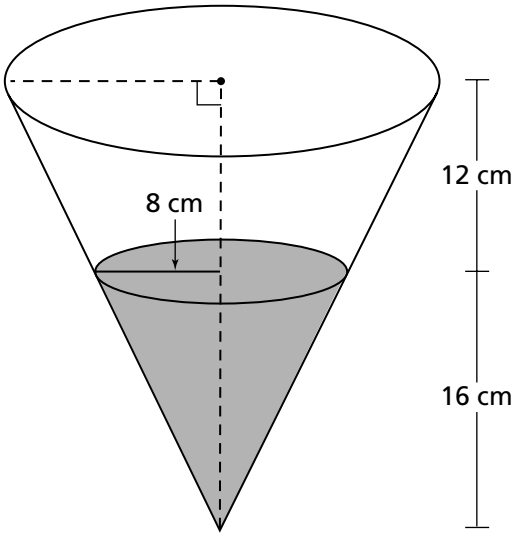
**b.** Are the 4-centimeter sphere and the 6-centimeter sphere similar? Explain your reasoning.

## Additional Practice *(continued)*



**5.** When a ball is immersed in water, it displaces $36\pi$ cubic centimeters of water. What is the radius of the ball?

**6.** A conical cup is partially filled with water as shown in the diagram below. Use the diagram to answer the following questions.




**a.** What is the radius of the top of the cup? Explain your reasoning.

**b.** What is the volume of the water in the cup?

**c.** What is the volume of the cup? Explain.

## Additional Practice *(continued)*



**7.** When a cube is dropped into a graduated cylinder partially filled with water, 125 ml of water are displaced. What is the length of each edge of the cube? Explain your reasoning.

**8. a.** Complete the table below for each rectangular box.

| Closed Box | Surface Area | Volume |
|---|---|---|
| A: 1-2-3 box | | |
| B: 2-4-6 box | | |
| C: 3-6-9 box | | |
| D: 4-8-12 box | | |

**b.** Use your table from part (a) to complete the table below.

| Boxes to Compare | Ratio of Dimensions | Ratio of Surface Areas | Ratio of Volumes |
|---|---|---|---|
| B and A | | | |
| C and A | | | |
| D and A | | | |
| D and B | | | |
| C and B | | | |
| D and C | | | |

**c.** What patterns do you see in the ratios?