# Question Bank

**1.** Could each of the nets below be folded along the lines to form a box? If yes, explain how. If no, explain why not.

**a.**

**b.**

**c.**

**d.**
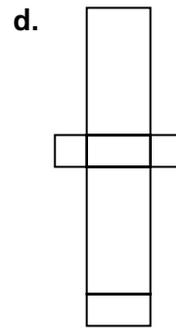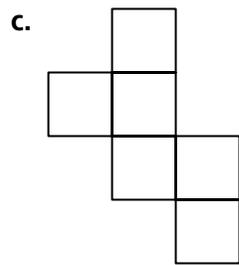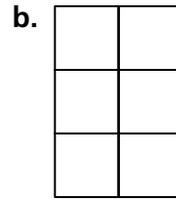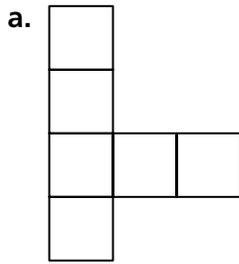
**2.** **a.** Ian said the two triangular prisms below could be placed together to form a square prism. Is Ian correct? If yes, explain how. If no, explain why not.

2 in.  2 in.

2 in.  2 in.
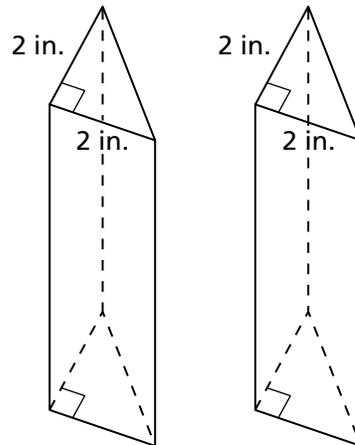
**b.** Ian also said the surface area of this square prism is the sum of the surface areas of the two triangular prisms. Is Ian correct? If yes, explain how. If no, explain why not.

**3.** There are eight identical cubes. Each computation below is the volume or surface area of a rectangular prism that is formed by the eight cubes. Indicate if this calculation is for the volume or the surface area. Perform each computation. Find the dimensions of the box.

  **a.** $8 \times 4 + 2$

  **b.** $2 \times 2 \times 2$

  **c.** $2 \times 1 \times 4$

  **d.** $2 \times 4 + 2 \times 4 \times 2 + 2 \times 2$

**4.** Billy used three toy prisms, a cylinder, and a half sphere to build a house and a barn as below.



90 degrees

2 in.     2 in.

2 in.

2 in.

2 in.

2 in.

2 in.

4 in.

1 in.

2 in.

2 in.

2 in.

4 in.
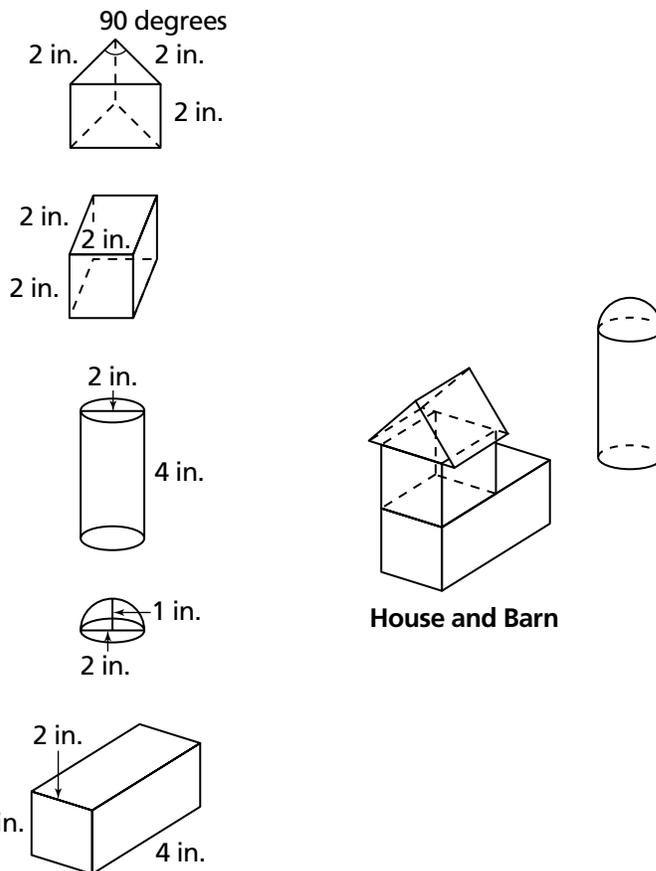
**House and Barn**

  **a.** What is the combined volume of the house and the barn?

  **b.** What is the surface area of the house?

**5.** Use the house and barn from Exercise 4 to answer the following questions.

    **a.** Given 1 inch = 2.54 centimeters. What is the volume of an inch cube in cubic centimeters?

    **b.** What is the volume of the house in cubic centimeters?

    **c.** Given 1 inch = 2.54 centimeters. What is the surface area of an inch cube in square centimeters?

    **d.** What is the surface area of the house in square centimeters?

**6.** One face of a cube has an area of 25 square centimeters.

    **a.** What is the surface area of the cube?

    **b.** What is the volume of the cube?

**7.** Sterling Sports manufactures high-quality basketballs. They package their basketballs in 1-cubic-foot cardboard boxes. The basketballs fit nicely in the boxes, just touching the sides. To keep the ball from being damaged, Sterling fills the empty space in the box with foam. How much foam is put into each basketball box?

**8.** The Spitzleys are going to put a rectangular pool in their backyard. The cost of excavating the dirt (digging up the dirt and taking it away) is $4,200. If the hole that is dug has dimensions of 25 meters by 15 meters by 3 meters, what is the cost for the excavation per cubic meter?
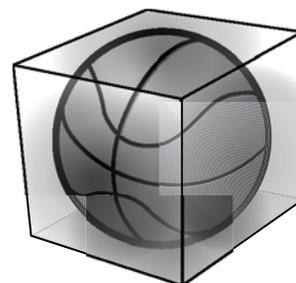
**9. a.** Make a sketch of a rectangular box with a base of 3 feet by 5 feet and a height of 7 feet. How many unit cubes would fit in a single layer at the bottom of the box?

    **b.** How many identical layers of unit cubes could be stacked in the box?

    **c.** What is the volume of the box?

**10.** Cement is sold by the cubic yard. A cubic yard of cement is the amount of cement that would fit into a box 1 yd long, 1 yd wide, and 1 yd high. How many cubic yards of cement are needed to make a rectangular patio 9 yards long, $6\frac{1}{2}$ yards wide and 6 inches ($\frac{1}{6}$ yard) thick?

**11.** Mali keeps her favorite amethyst in a cubic box with a volume of 343 cubic centimeters. What is the surface area of her box? Show your work.

**12.** The Tennis for Champs company is looking into new ways to package tennis balls. The packaging engineer at the company is exploring options for vacuum packing the balls (removing the air from the containers in which they are packaged) so they will retain good bounce. He wonders how much air there is in a standard container of tennis balls. Find the amount of empty space in a cylindrical container that is 18 centimeters tall and contains three tennis balls 6 centimeters in diameter.

**13.** Ms. Wohlshied has to purchase paper cups and containers of water for the track-and-field competition. She knows that students often use a cup only once and then throw it away. She buys cone-shaped cups because they are nice for holding and don't cost very much. This is an illustration of the cups she buys.

3 cm

7 cm
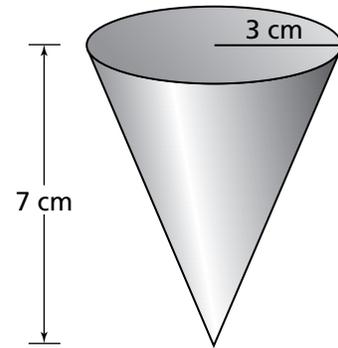
   **a.** How many cubic centimeters of water does the cone-shaped cup hold?

   **b.** If Ms. Wohlshied buys water in 1-liter jugs, about how many empty cups can be filled from one jug of water? (1 liter = 1,000 cubic centimeters)

   **c.** How many times greater is the volume of a cone with a radius of 6 centimeters and a height of 7 centimeters than the volume of Ms. Wohlshied's cup?

   **d.** How many times greater is the volume of a cone with a radius of 3 centimeters and a height of 14 centimeters than the volume of Ms. Wohlshied's cup?

   **e.** How many times greater is the volume of a cone with a radius of 6 centimeters and a height of 14 centimeters than the volume of Ms. Wohlshied's cup?