

8.6.D2 – Applications With Volume**SHOW ALL WORK ON A SEPARATE SHEET OF PAPER.****ROUND TO THE NEAREST TENTH, UNLESS OTHERWISE STATED.**

1. Consider two cans of pizza sauce. Furmano's has a diameter of 10 centimeters and a height of 20.5 centimeters and sells for \$ 3.49. Dei Fratelli's has a diameter of 7.5 centimeters and of height of 11 centimeters and sells for \$ 1.09. Which can is the better buy? Explain your reasoning.

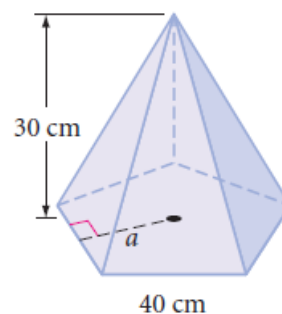


2. A cubic fish tank with 4.6-meter edges is filled with water. How much water will be remaining if some is drained to fill a cylindrical tank with a radius of 2.2 meters and a height of 4.6 meters?
3. A birthday gift fits into a box with dimensions: 55 centimeters \times 40 centimeters \times 5 centimeters. What is the maximum volume of the gift? You have a limited amount of wrapping paper – one sheet measuring 75 centimeters \times 100 centimeters Do you have enough paper to wrap the present? Explain your reasoning.
4. How much cat food will fit into a can that has a height of 14.5 centimeters and a diameter of 9 centimeters? How much paper would be needed to make the label?
5. If you roll an 8.5-by-11-inch piece of paper into a cylinder by bringing the two longer sides together, you get a tall, thin cylinder. If you roll an 8.5-by-11-inch piece of paper into a cylinder by bringing the two shorter sides together, you get a short, fat cylinder. Will the two cylinders have the same volume? Explain your reasoning.
6. Although the Exxon Valdez oil spill is one of the most notorious oil spills, it was small compared to the 250 million gallons of crude oil that were spilled during the 1991 Persian Gulf War. A gallon occupies 0.13368 cubic foot. How many rectangular swimming pools, each 20 feet by 30 feet by 5 feet, could be filled with 250 million gallons of crude oil?
7. Mount Fuji, the active volcano in Honshu, Japan, is 3776 meters high and has a slope of approximately 30° . Mount Etna, in Sicily, is 3350 meters high and approximately 50 kilometers across the base. If you assume they both can be approximated by cones, which volcano is larger?
8. If you cut a 1-inch square out of each corner of an 8.5-by-11-inch piece of paper and fold it into a box without a lid, what is the volume of the container?
9. A sealed rectangular container 6 centimeters by 12 centimeters by 15 centimeters is sitting on its smallest face. It is filled with water up to 5 centimeters from the top. How many centimeters from the bottom will the water level reach if the container is placed on its largest face?

10. Sylvia has just discovered that the valve on her cement truck failed during the night and that all the contents ran out to form a giant cone of hardened cement. To make an insurance claim, she needs to figure out how much cement is in the cone. The circumference of the base is 44 feet, and it is 5 feet high. Calculate the volume to the nearest cubic foot.

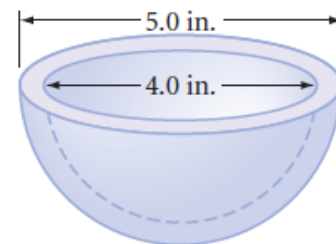


11. Bretislav has designed a crystal glass sculpture. Part of the piece is in the shape of a large regular pentagonal pyramid, shown at right. The apothem of the base measures 27.5 centimeters.



- The area of a regular polygon can be found using the formula: $A = 0.5ap$, where a is the apothem of the polygon and p is the perimeter of the polygon. Find the volume of the pyramid.
 - How much will this part of the sculpture weigh if the glass he plans to use weighs 2.85 grams per cubic centimeter?
12. Lickety Split ice cream comes in a cylindrical container with an inside diameter of 6 inches and a height of 10 inches. The company claims to give the customer 25 scoops of ice cream per container, each scoop being a sphere with a 3-inch diameter. How many scoops does each container really hold?

13. Find the volume of plastic (to the nearest cubic inch) needed for this hollow toy component. The outer-hemisphere diameter is 5 inches; the inner-hemisphere diameter is 4 inches.



14. A swimming pool is in the shape of a pentagonal prism. A cross section of the swimming pool is also shown.

- In order to find the volume of any prism, we need to know the area of the base and the altitude/height of the prism. The base of the pool is a pentagon, we can find its area by “chopping” it up into polygons that we know how to find the area of. Use this method to find the area of the pentagonal base.
- How many cubic feet of water will the pool hold?
- A cubic foot of water is about 7.5 gallons. How many gallons of water can the pool hold?
- If a pump is able to pump water into the pool at a rate of 15 gallons per minute, approximately how many hours will it take to fill the pool?

