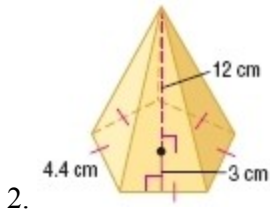
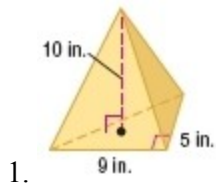


12-5 Volumes of Pyramids and Cones

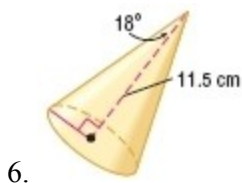
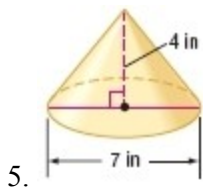
Find the volume of each pyramid.



3. a rectangular pyramid with a height of 5.2 meters and a base 8 meters by 4.5 meters

4. a square pyramid with a height of 14 meters and a base with 8-meter side lengths

Find the volume of each cone. Round to the nearest tenth.

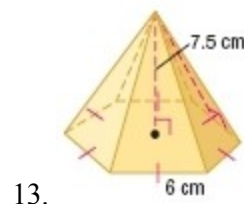
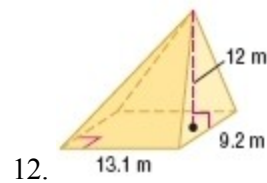
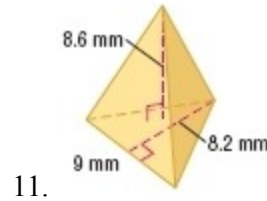
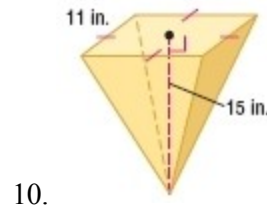


7. an oblique cone with a height of 10.5 millimeters and a radius of 1.6 millimeters

8. a cone with a slant height of 25 meters and a radius of 15 meters

9. **MUSEUMS** The sky dome of the National Corvette Museum in Bowling Green, Kentucky, is a conical building. If the height is 100 feet and the area of the base is about 15,400 square feet, find the volume of air that the heating and cooling systems would have to accommodate. Round to the nearest tenth.

CCSS SENSE-MAKING Find the volume of each pyramid. Round to the nearest tenth if necessary.

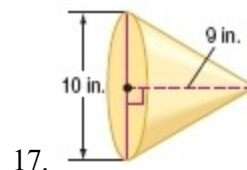


14. a pentagonal pyramid with a base area of 590 square feet and an altitude of 7 feet

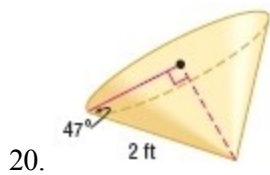
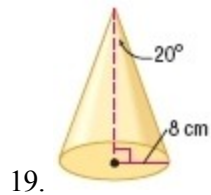
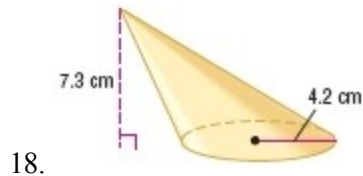
15. a triangular pyramid with a height of 4.8 centimeters and a right triangle base with a leg 5 centimeters and hypotenuse 10.2 centimeters

16. A triangular pyramid with a right triangle base with a leg 8 centimeters and hypotenuse 10 centimeters has a volume of 144 cubic centimeters. Find the height.

Find the volume of each cone. Round to the nearest tenth.



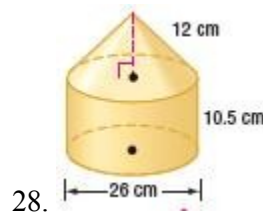
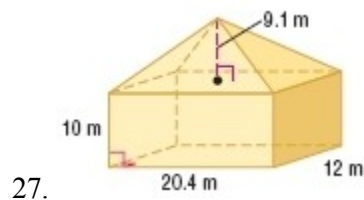
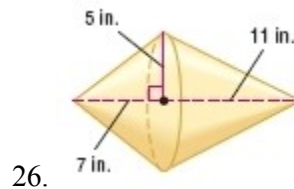
12-5 Volumes of Pyramids and Cones



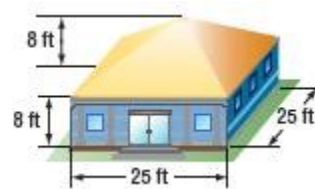
21. an oblique cone with a diameter of 16 inches and an altitude of 16 inches
22. a right cone with a slant height of 5.6 centimeters and a radius of 1 centimeter
23. **SNACKS** Approximately how many cubic centimeters of roasted peanuts will completely fill a paper cone that is 14 centimeters high and has a base diameter of 8 centimeters? Round to the nearest tenth.
24. **CCSS MODELING** The Pyramid Arena in Memphis, Tennessee, is the third largest pyramid in the world. It is approximately 350 feet tall, and its square base is 600 feet wide. Find the volume of this pyramid.
25. **GARDENING** The greenhouse is a regular octagonal pyramid with a height of 5 feet. The base has side lengths of 2 feet. What is the volume of the greenhouse?



Find the volume of each solid. Round to the nearest tenth.



29. **HEATING** Sam is building an art studio in her backyard. To buy a heating unit for the space, she needs to determine the BTUs (British Thermal Units) required to heat the building. For new construction with good insulation, there should be 2 BTUs per cubic foot. What size unit does Sam need to purchase?



30. **SCIENCE** Marta is studying crystals that grow on rock formations. For a project, she is making a clay model of a crystal with a shape that is a composite of two congruent rectangular pyramids. The base of each pyramid will be 1 by 1.5 inches, and the total height will be 4 inches.

Determine the volume of the model. Explain why knowing the volume is helpful in this situation.

12-5 Volumes of Pyramids and Cones

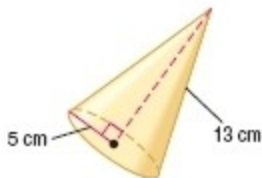
31. **CHANGING DIMENSIONS** A cone has a radius of 4 centimeters and a height of 9 centimeters. Describe how each change affects the volume of the cone.
- The height is doubled.
 - The radius is doubled.
 - Both the radius and the height are doubled.

Find each measure. Round to the nearest tenth if necessary.

32. A square pyramid has a volume of 862.5 cubic centimeters and a height of 11.5 centimeters. Find the side length of the base.
33. The volume of a cone is 196π cubic inches and the height is 12 inches. What is the diameter?
34. The lateral area of a cone is 71.6 square millimeters and the slant height is 6 millimeters. What is the volume of the cone?
35. **MULTIPLE REPRESENTATIONS** In this problem, you will investigate rectangular pyramids.
- GEOMETRIC** Draw two pyramids with different bases that have a height of 10 centimeters and a base area of 24 square centimeters.
 - VERBAL** What is true about the volumes of the two pyramids that you drew? Explain.
 - ANALYTICAL** Explain how multiplying the base area and/or the height of the pyramid by 5 affects the volume of the pyramid.
36. **CCSS ARGUMENTS** Determine whether the following statement is sometimes, always, or never true. Justify your reasoning.

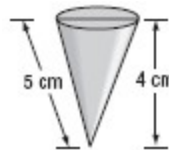
The volume of a cone with radius r and height h equals the volume of a prism with height h .

37. **ERROR ANALYSIS** Alexandra and Cornelio are calculating the volume of the cone below. Is either of them correct? Explain your answer.



<p><i>Alexandra</i></p> $V = \frac{1}{3}Bh$ $= \frac{1}{3}\pi(5^2)(13)$ $\approx 340.3 \text{ cm}^3$	<p><i>Cornelio</i></p> $5^2 + 12^2 = 13^2$ $V = \frac{1}{3}Bh$ $= \frac{1}{3}\pi(5^2)(12)$ $\approx 314.2 \text{ cm}^3$
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38. **REASONING** A cone has a volume of 568 cubic centimeters. What is the volume of a cylinder that has the same radius and height as the cone? Explain your reasoning.
39. **OPEN ENDED** Give an example of a pyramid and a prism that have the same base and the same volume. Explain your reasoning.
40. **WRITING IN MATH** Compare and contrast finding volumes of pyramids and cones with finding volumes of prisms and cylinders.
41. A conical sand toy has the dimensions as shown below. How many cubic centimeters of sand will it hold when it is filled to the top?



- 12π
 - 15π
 - $\frac{80}{3}\pi$
 - $\frac{100}{3}\pi$
42. **SHORT RESPONSE** Brooke is buying a tent that is in the shape of a rectangular pyramid. The base is 6 feet by 8 feet. If the tent holds 88 cubic feet of air, how tall is the tent's center pole?
43. **PROBABILITY** A spinner has sections colored red, blue, orange, and green. The table below shows the results of several spins. What is the experimental probability of the spinner landing on orange?

Color	Frequency
red	6
blue	4
orange	5
green	10

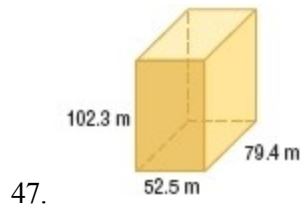
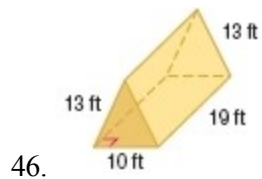
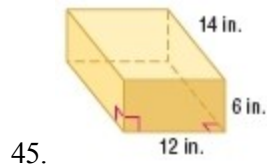
- $\frac{1}{5}$
- $\frac{1}{4}$
- $\frac{9}{25}$
- $\frac{1}{2}$

12-5 Volumes of Pyramids and Cones

44. SAT/ACT For all $x \neq -2$ or 0 , $\frac{x^2 - 2x - 8}{x^2 + 2x} = ?$

- A -8
 B $x - 4$
 C $\frac{-x - 4}{x}$
 D $\frac{-8}{x + 2}$
 E $\frac{x - 4}{x}$

Find the volume of each prism.



48. **FARMING** The picture shows a combination hopper cone and bin used by farmers to store grain after harvest. The cone at the bottom of the bin allows the grain to be emptied more easily. Use the dimensions in the diagram to find the entire surface area of the bin with a conical top and bottom. Write the exact answer and the answer rounded to the nearest square foot. Refer to the photo on Page 863.

Find the area of each shaded region. Polygons in 50 - 52 are regular.

