

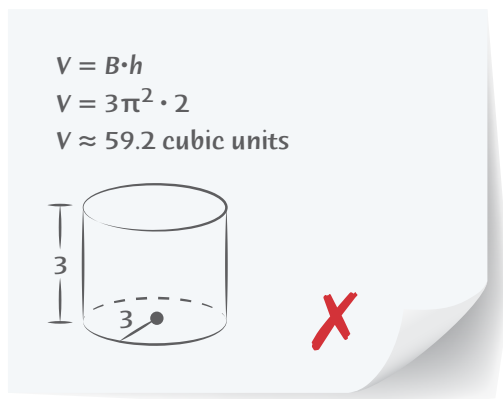


UNDERSTAND

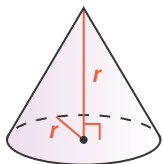
12. **Construct Arguments** A stack of 39 pennies is exactly as tall as a stack of 31 nickels. Do the two stacks have the same volume? Explain.



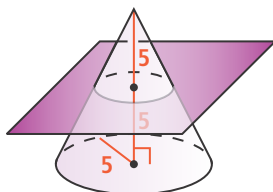
13. **Error Analysis** Jacob is finding the volume of the cylinder. What is his error?



14. **Communicate Precisely** How would you find the volume of a right square pyramid with a base side length of 10 cm, and the altitude of a triangular side is 13 cm? Explain.
15. **Mathematical Connections** In terms of the radius r , what is the volume of a cone whose height is equal to its radius?



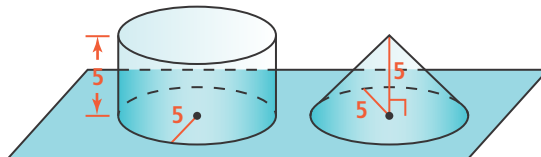
16. **Higher Order Thinking** A plane slices a cone parallel to the base at one-half of the height of the cone. What is the volume of the part of the cone lying below the plane?



PRACTICE

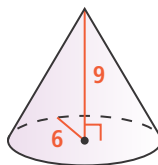
17. The plane intersects sections of equal area in the two solids. Are the volumes equal?

SEE EXAMPLE 1

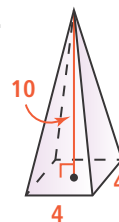


For Exercises 18–21, find the volume of each solid. Assume that all angles in each polygonal base are congruent. SEE EXAMPLE 2

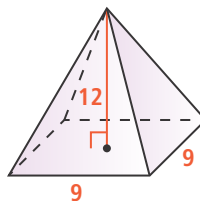
18.



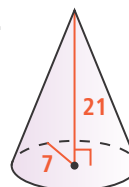
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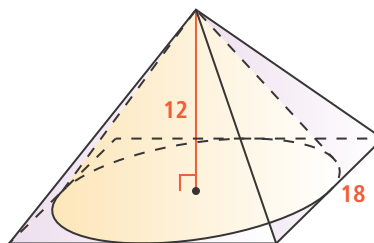
20.



21.

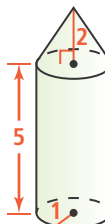


22. A cone is inscribed in a right square pyramid. What is the remaining volume if the cone is removed? SEE EXAMPLES 3 AND 4

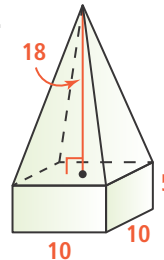


For Exercises 23 and 24, find the volume of each composite figure. SEE EXAMPLE 5

23.

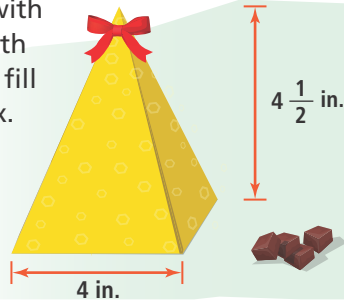


24.

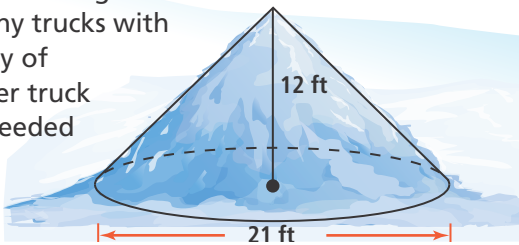


APPLY

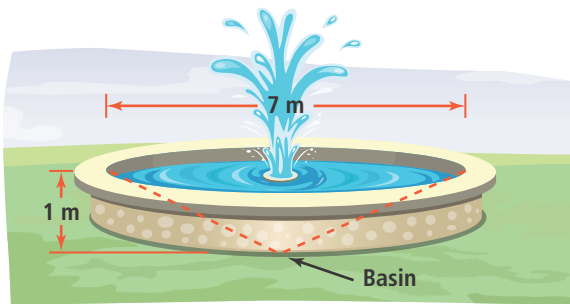
- 25. Make Sense and Persevere** Chiang makes gift boxes in the shape of a right square pyramid. She fills each box with chocolate cubes with $\frac{7}{8}$ -in. sides. She can fill about 75% of a box. How many pieces can she fit in each box?



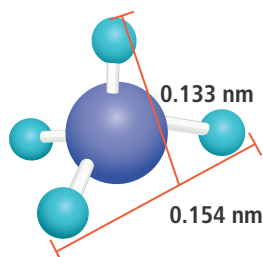
- 26. Reason** A pile of snow is plowed into the shape of a right cone. How many trucks with a capacity of 10 yd^3 per truck will be needed to move the pile?



- 27. Use Structure** The basin beneath a fountain is a right cone that is 7 m across and 1 m deep at the center. After the fountain is cleaned, the pool is refilled at a rate of 300 L/min. One cubic meter is 1,000 L. How long does it take to refill the pool?



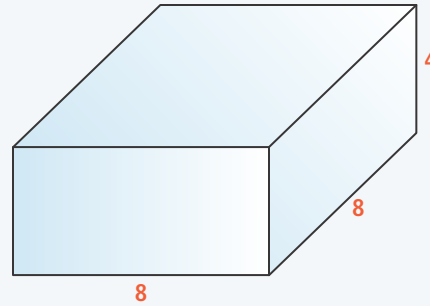
- 28. Model With Mathematics** A physicist wants to know what percentage of gas is empty space. A molecule of methane can be modeled by a regular tetrahedron with side length 0.154 nm ($1 \text{ nm} = 1 \times 10^{-9} \text{ m}$). The altitude of each triangular side is 0.133 nm. If 6.022×10^{23} molecules make up 0.0224 m^3 of gas, how does the volume of the molecules compare to the volume of the gas?



ASSESSMENT PRACTICE

- 29.** Cavalieri's Principle states that if two solids have the same ? and the same ? at every cross section, then the two solids have the same ? .

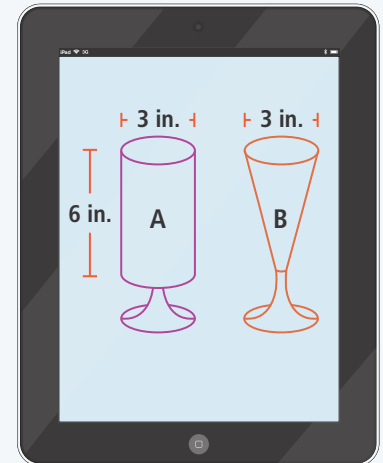
- 30. SAT/ACT** Which is the volume of the largest cone that will fit entirely within the right square prism?



- (A) $\frac{16\pi}{3}$ (B) $\frac{32\pi}{3}$ (C) $\frac{64\pi}{3}$ (D) $\frac{128\pi}{3}$

- 31. Performance Task**

A designer is working on a design for two goblets. Design A is based on a cylinder and design B is based on a cone. The client wants both goblets to be the same height and width.



Part A The client wants the smaller goblet to hold at least 10 fl oz. One fluid ounce is 1.8 in.^3 . Will design B be large enough to meet the client's requirements? Explain.

Part B The client wants the larger goblet to hold 20 fl oz. Does design A meet the client's requirement? Explain.

Part C How could design B be changed if the client wants the smaller goblet to hold at least 12 fl oz?