

12-8 Volume: Pyramids and Cones

(Pages 649–653)

When you find the volume of a pyramid or cone, you must know the height h . The height is *not* the same as the lateral height, which you learned in an earlier lesson. The height h of a pyramid or cone is the length of a segment from the vertex to the base, perpendicular to the base.

Volume of a Pyramid	If a pyramid has a base of B square units, and a height of h units, then the volume V is $\frac{1}{3} \cdot B \cdot h$ cubic units, or $V = \frac{1}{3}Bh$.
Volume of a Cone	If a cone has a radius of r units and a height of h units, then the volume V is $\frac{1}{3} \cdot \pi \cdot r^2 \cdot h$ cubic units, or $V = \frac{1}{3}\pi r^2h$.

EXAMPLES

Find the volume of the given figures.

A a square pyramid with a base side length of 6 cm and a height of 15 cm

$$V = \frac{1}{3}Bh \quad \text{Formula for the volume of a pyramid}$$

$$V = \frac{1}{3}s^2h \quad \text{Replace } B \text{ with } s^2.$$

$$V = \frac{1}{3}(6)^2(15) \text{ or } 180 \text{ cm}^3$$

B a cone with a radius of 3 in. and a height of 8 in.

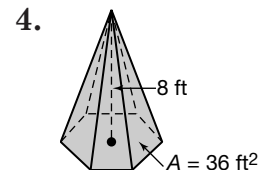
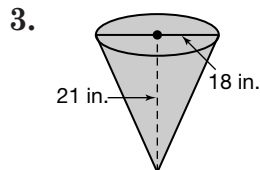
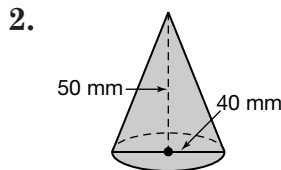
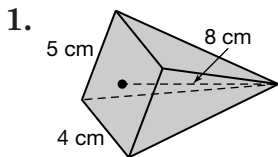
$$V = \frac{1}{3}\pi r^2h \quad \text{Formula for the volume of a cone}$$

$$V = \frac{1}{3}\pi(3)^2(8) \quad r = 3 \text{ and } h = 8$$

$$V = \frac{1}{3}\pi(9)(8) \text{ or about } 75.4 \text{ in}^3$$

PRACTICE

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



5. **Cooking** A spice jar is 3 inches tall and 1.5 inches in diameter. A funnel is 2 inches tall and 2.5 inches in diameter. If Hayden fills the funnel with pepper to put into the spice jar, will it overflow?



6. **Standardized Test Practice** A square pyramid is 6 feet tall and with the sides of the base 8 feet long. What is the volume of the pyramid?

A 96 ft^3

B 128 ft^3

C 192 ft^3

D 384 ft^3

Answers: 1. 53.3 cm^3 2. $20,944.0 \text{ mm}^3$ 3. 1781.3 in^3 4. 96 ft^3 5. No; jar volume $\approx 5.3 \text{ in}^3$, funnel volume $\approx 3.3 \text{ in}^3$ 6. B