

13.2 Volume of Cones

Common Core Standard

8.G.9

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world problems and mathematical problems

$$\begin{aligned} \textcircled{1} \quad V &= \pi r^2 h \\ &= 3.14 \times 5.25^2 \times 13 \\ &= 3.14 \times 27.5625 \times 13 \\ &\approx 1125.1 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad V &= \pi r^2 h \\ &= 3.14 \times 6.5^2 \times 24 \\ &= 3.14 \times 42.25 \times 24 \\ &\approx 3184 \text{ cm}^3 \end{aligned}$$

Use 3.14 for π . Round answers to the nearest tenth if necessary.

1. A can of chili has a radius of 5.25 cm and a height of 13 cm. Find the volume.
2. A cylindrical carton of oatmeal has a diameter of 13 cm and is 24 cm tall. Find the volume.
3. Which has a greater volume?
Cylinder A: $r = 3$ m, $h = 1.2$ m
Cylinder B: $d = 4$ m, $h = 2.5$ m

$$\begin{aligned} \textcircled{3} \quad & \text{A} \\ V &= \pi r^2 h \\ &= 3.14 \times 3^2 \times 1.2 \\ &= 3.14 \times 9 \times 1.2 \\ &\approx 33.9 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & \text{B} \\ V &= \pi r^2 h \\ &= 3.14 \times 2^2 \times 2.5 \\ &= 3.14 \times 4 \times 2.5 \\ &\approx 31.4 \text{ m}^3 \end{aligned}$$

Cylinder A

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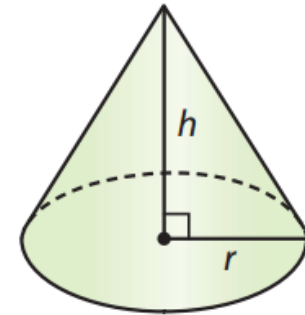
Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world problems and mathematical problems

Cone - is a three-dimensional figure that has one vertex and one circular base

Volume of a Cone

The Volume V of a cone with a radius r is one third the area of the base B times the height h .

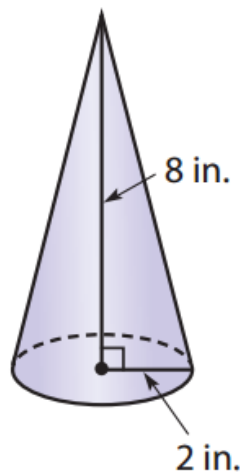
$$V = \frac{1}{3}Bh \quad \text{or} \quad V = \frac{1}{3}\pi r^2 h$$



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

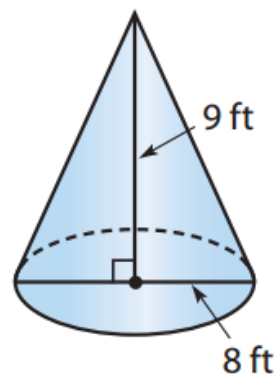
Use 3.14 for π .

A



$$\begin{aligned}
 V &= \frac{1}{3} \pi r^2 h \\
 &= \frac{1}{3} \times 3.14 \times 2^2 \times 8 \\
 &= \frac{1}{3} \times 3.14 \times 4 \times 8 \\
 &\approx 33.5 \text{ in}^3
 \end{aligned}$$

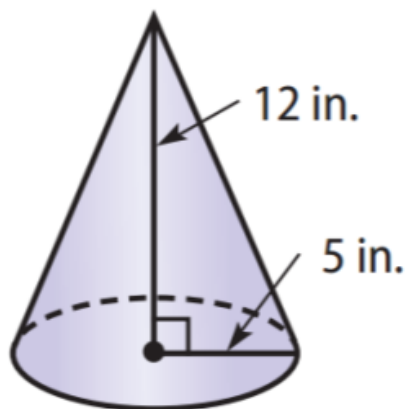
B



$$\begin{aligned}
 V &= \frac{1}{3} \pi r^2 h \\
 &= \frac{1}{3} \times 3.14 \times 4^2 \times 9 \\
 &= \frac{1}{3} \times 3.14 \times 16 \times 9 \\
 &\approx 150.7 \text{ ft}^3
 \end{aligned}$$

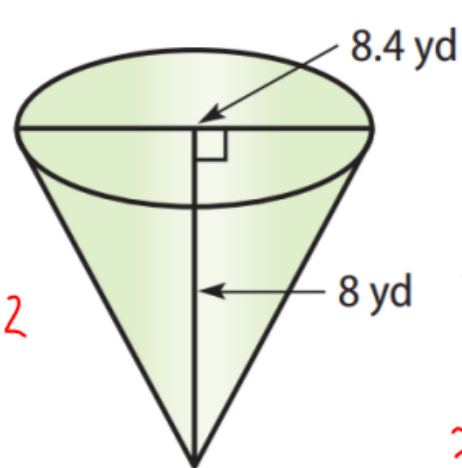
**Find the volume of each cone.
Round your answers to the nearest
tenth. Use 3.14 for π .**

A



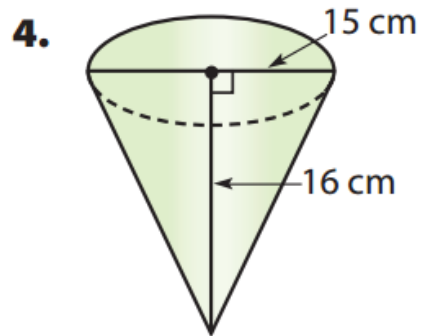
$$\begin{aligned}
 V &= \frac{1}{3}\pi r^2 h \\
 &= \frac{1}{3} \times 3.14 \times 5^2 \times 12 \\
 &= \frac{1}{3} \times 3.14 \times 25 \times 12 \\
 &\approx 314 \text{ in}^3
 \end{aligned}$$

B

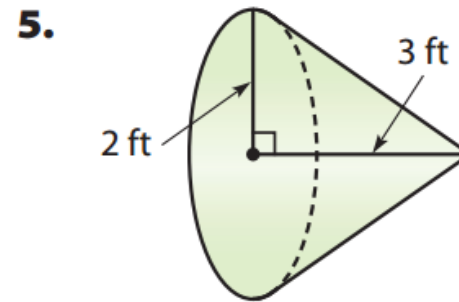


$$\begin{aligned}
 V &= \frac{1}{3}\pi r^2 h \\
 &= \frac{1}{3} \times 3.14 \times 4.2^2 \times 8 \\
 &= \frac{1}{3} \times 3.14 \times 17.64 \times 8 \\
 &\approx 147.7 \text{ yds}^3
 \end{aligned}$$

Find the volume of each cone. Round your answers to the nearest tenth.
Use 3.14 for π .



$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \times 3.14 \times 15^2 \times 16 \\ &= \frac{1}{3} \times 3.14 \times 225 \times 16 \\ &\approx 942 \text{ cm}^3 \end{aligned}$$



$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \times 3.14 \times 2^2 \times 3 \\ &= \frac{1}{3} \times 3.14 \times 4 \times 3 \\ &\approx 12.6 \text{ ft}^3 \end{aligned}$$

For her geography project, Karen built a clay model of a volcano in the shape of a cone. Her model has a diameter of 12 inches and a height of 8 inches. Find the volume of clay in her model to the nearest tenth. Use 3.14 for π .

STEP 1 Find the radius.

$$r = \frac{d}{2} = \frac{12}{2} = 6$$

STEP 2 Find the volume of clay.

$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \times 3.14 \times 6^2 \times 8 \\ &= \frac{1}{3} \times 3.14 \times 36 \times 8 \end{aligned}$$

$$\approx 301.44 \text{ in}^3$$



A model of a volcano is in the shape of a cone. The model has a circular base with a diameter of 48 centimeters and a height of 12 centimeters. Find the volume of the cone in the model to the nearest tenth. Use 3.14 for π .

$$\begin{aligned}V &= \frac{1}{3} \pi r^2 h \\&= \frac{1}{3} \times 3.14 \times 24^2 \times 12 \\&= \frac{1}{3} \times 3.14 \times 576 \times 12 \\&= 7234.6 \text{ cm}^3\end{aligned}$$

The cone of the volcano Parícutin in Mexico had a height of 410 meters and a diameter of 424 meters. Approximate the volume of the cone.

$$\begin{aligned}V &= \frac{1}{3} \pi r^2 h \\&= \frac{1}{3} \times 3.14 \times 212^2 \times 410 \\&= \frac{1}{3} \times 3.14 \times 44944 \times 410 \\&\approx 19,286,968.5 \text{ m}^3\end{aligned}$$



HW

GP p 408 (1-7)

IP p 409 (8-18)