

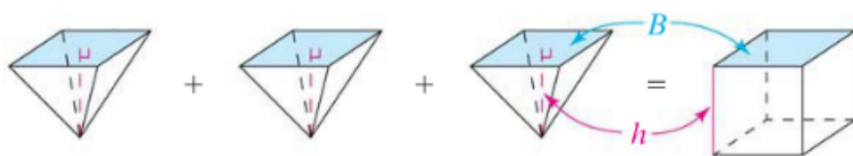
8-7**Volumes of Pyramids and Cones****What You'll Learn**

To find the volumes of pyramids and cones

Why Learn This?

When you fill an ice cream cone or use a funnel, you must consider volume. The volumes of pyramids and cones are related to the volumes of prisms and cylinders.

The contents you need to fill a prism with base area B will fill exactly three pyramids with the same base area and height as the prism.



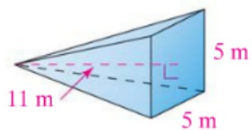
Put this in your Evernote notes

KEY CONCEPTS **Volume of a Pyramid**

The volume V of a pyramid is one third the product of the base area B and the height h .

$$V = \frac{1}{3}Bh$$





EXAMPLE Finding Volume of a Square Pyramid

- 1 Find the volume of the pyramid at the left to the nearest cubic meter.

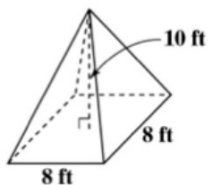
Step 1 Find the area of the base. **Step 2** Find the volume.

$$\begin{aligned} B &= s^2 && \leftarrow \text{area of a square} \\ &= 11^2 && \leftarrow \text{Substitute.} \\ &= 121 && \leftarrow \text{Simplify.} \end{aligned}$$

$$\begin{aligned} V &= \frac{1}{3}Bh && \leftarrow \text{volume of a pyramid} \\ &= \frac{1}{3}(121)11 && \leftarrow \text{Substitute 121 for } B \text{ and 11 for } h. \\ &= 1478.\bar{6} && \leftarrow \text{Multiply.} \end{aligned}$$

The volume of the pyramid is about 1479 m³.

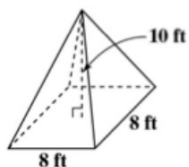
- 1 EXAMPLE Find the volume of the pyramid to the nearest cubic foot.



Step 1 Find the area of the base.

$$\begin{aligned} B &= s^2 && \leftarrow \text{area of a square formula} \\ &= 8^2 && \leftarrow \text{Substitute.} \\ &= 64 && \leftarrow \text{Simplify.} \end{aligned}$$

Step 2 Use the base area to find the volume.



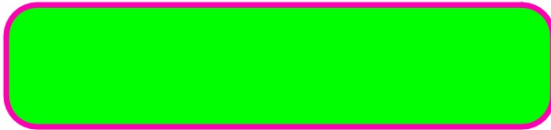
$$\begin{aligned} V &= \frac{1}{3}Bh && \leftarrow \text{volume of a pyramid formula} \\ &= \frac{1}{3}(64)(10) && \leftarrow \text{Substitute.} \\ &= 213.3333 && \leftarrow \text{Multiply.} \end{aligned}$$

The volume of the pyramid is approximately 213 ft³.

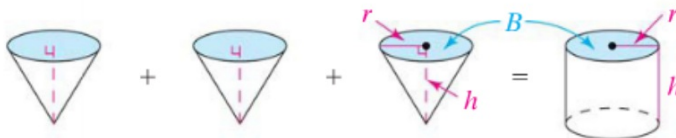
Table talk about this with your table partners. Use your calculators.

Quick Check

1. Find the volume of a square pyramid with a base-edge length of 30 in. and a height of 64 in. to the nearest cubic inch.



The contents of three cones fill a cylinder with the same dimensions.

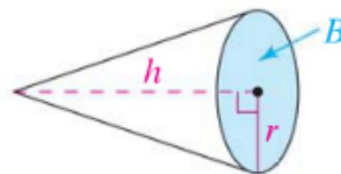


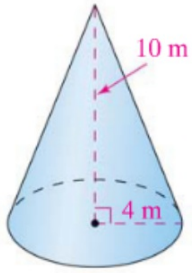
Put the volume of a cone formula in your notes:

KEY CONCEPTS Volume of a Cone

The volume V of a cone is one third the product of base area B and height h .

$$V = \frac{1}{3} Bh$$





EXAMPLES Using the Volume Formula

- 2 Find the volume of the cone at the left to the nearest cubic meter.

Step 1 Find base area, B .

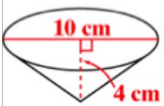
$$\begin{aligned} B &= \pi r^2 && \leftarrow \text{area of a circle} \\ &= \pi(4^2) && \leftarrow \text{Substitute.} \\ &= 16\pi && \leftarrow \text{Simplify.} \end{aligned}$$

Step 2 Find the volume.

$$\begin{aligned} V &= \frac{1}{3}Bh && \leftarrow \text{volume of a cone} \\ &= \frac{1}{3}(16\pi)10 && \leftarrow \text{Substitute } 16\pi \text{ for } B \\ &&& \text{and } 10 \text{ for } h. \\ &\approx 168 && \leftarrow \text{Simplify.} \end{aligned}$$

The volume of the cone is about 168 m^3 .

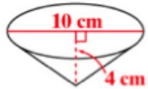
- 2 **EXAMPLE** Find the volume of this cone to the nearest cubic centimeter.



Step 1 Find the area of the base.

$$\begin{aligned} B &= \pi r^2 && \leftarrow \text{area of a circle formula} \\ &= \pi(5^2) && \leftarrow \text{Substitute.} \\ &= 25\pi && \leftarrow \text{Simplify.} \end{aligned}$$

Step 2 Use the base area to find the volume.



$$\begin{aligned} V &= \frac{1}{3}Bh && \leftarrow \text{cone volume formula} \\ &= \frac{1}{3}(25\pi)4 && \leftarrow \text{Substitute.} \\ &= 33\frac{1}{3}\pi && \leftarrow \text{Simplify.} \end{aligned}$$

To the nearest cubic centimeter, the volume of the cone is 105 cm^3 .

Table talk about this problem.



1. A square pyramid has a base area of 9 m^2 and a height of 5 m.
What is the volume of the pyramid?
 - A. 45 m^3
 - B. 25 m^3
 - C. 20 m^3
 - D. 15 m^3

Go to tenmarks where you have an assignment waiting on volume.