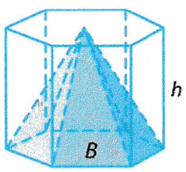
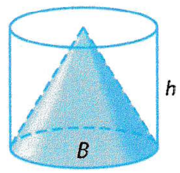
Volumes of Cones

2 Volume of Cones The pyramid and prism shown have the same base area B and height h as the cylinder and cone. Since the volume of the pyramid is one third the volume of the prism, then by Cavalieri's Principle, the volume of the cone must be one third the volume of the cylinder.

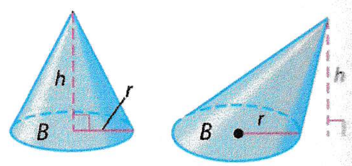




KeyConcept Volume of a Cone

Words The volume of a circular cone is $V = \frac{1}{3}Bh$, or $V = \frac{1}{3}\pi r^2 h$, where B is the area of the base, h is the height of the cone, and r is the radius of the base.

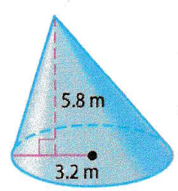
Models



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

Example 2 Volume of a Cone

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



$V = \frac{1}{3}\pi r^2 h$ — Volume of a cone

$\approx \frac{1}{3}\pi(3.2)^2(5.8)$ — $r = 3.2$ and $h = 5.8$

≈ 62.2 — Use a calculator.

The volume of the cone is approximately 62.2 cubic meters.

Find the volume.

$V = \frac{1}{3}\pi r^2 h$ — Volume of a cone

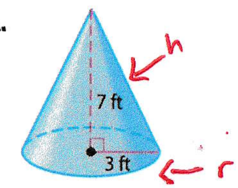
$\approx \frac{1}{3}\pi(6.9)^2(11)$ — $r \approx 6.9$ and $h = 11$

≈ 548.4 — Use a calculator.

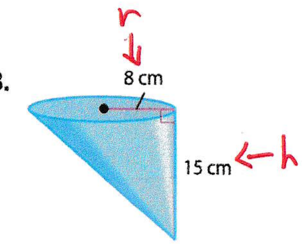
The volume of the cone is approximately 548.4 cubic inches.

GuidedPractice

2A.



2B.



2A. $V = 1/3\, \pi r^2 h$

$1/3 \cdot 3.14 \cdot 3^2 \cdot 7$

$= 65.94\ ft^3$

2B. $V = 1/3\, \pi r^2 h$

$= 1/3 \cdot 3.14 \cdot 8^2 \cdot 15$

$= 1004.8\ cm^3$