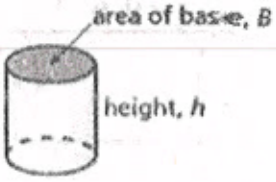
Notes 9.5 Volume of Cylinders and Cones

Words The volume, V, of a cylinder is the product of the area of the base and the height of the cylinder.



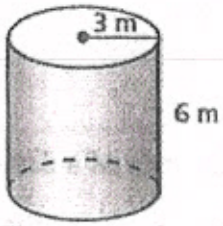
Algebra $V = Bh$

Area of base — Height of cylinder

Example 1: Find the volume of the cylinder. Round to the nearest tenth.

$V = Bh$	Write the formula for volume.
$V = (\pi r^2)h$	Substitute the area of a circle formula in for B.
$V = \pi(3)^2(6)$	Substitute 3 in for radius and 6 for height.
$V = 54\pi \approx 169.64$	Multiply and round.

$V \approx 169.6\ m^3$



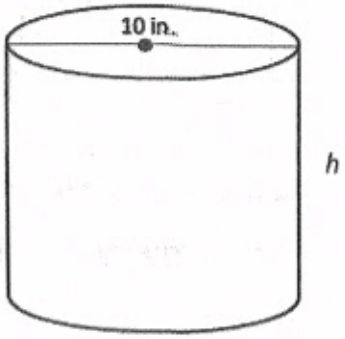
Example 2: Find the height of the cylinder. Round to the nearest whole number.

The diameter is 10 inches. So, the radius is 5 inches.

$V = Bh$	Write the formula for volume.
$V = (\pi r^2)h$	Substitute the area of a circle formula in for B.
$314 = (\pi(5)^2)(h)$	Substitute 314 in for V and 5 in for the radius.
$314 = 25\pi h$	Multiply.
$\frac{314}{25} = \frac{25\pi h}{25}$	Divide both sides by 25.
$\frac{12.56}{\pi} = \frac{\pi h}{\pi}$	Divide both sides by π.
$3.9979 \approx h$	Round.

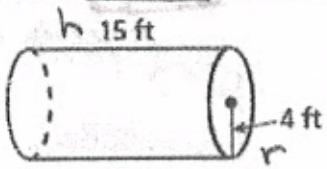
$h \approx 4\ inches$

$V = 314\ in^3$



Try This:

a. Find the volume of the cylinder to the nearest tenth.



$V = Bh$

$V = (\pi r^2)h$

$V = \pi(4)^2(15)$

$V = \pi(16)(15)$

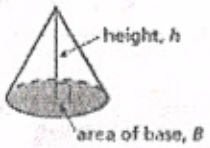
$V = 240\pi$

$V \approx 753.98$

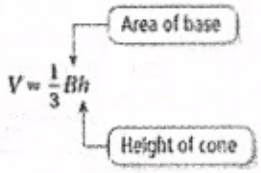
$V \approx 754.0 \text{ ft}^3$

Volume of a Cone

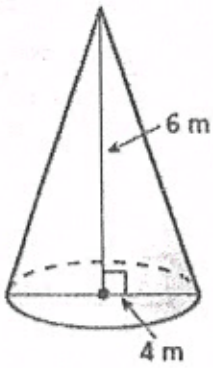
Words: The volume, V, of a cone is one-third the product of the area of the base and the height of the cone.



Algebra



Example 3: Find the volume of the cone. Round to the nearest tenth.

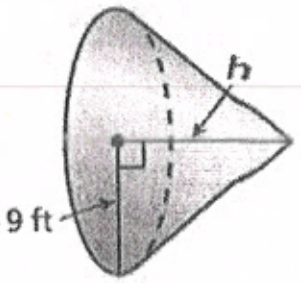


The diameter is 4 meters. So, the radius is 2 meters.

$V = \frac{1}{3}Bh$	Write formula for volume.
$V = \frac{1}{3}(\pi r^2)h$	Substitute the area of a circle formula in for B.
$V = \frac{1}{3}(\pi(2)^2)(6)$	Substitute 2 in for the radius and 6 in for the height.
$V = 8\pi$	Multiply.
$V \approx 25.132$	Round.

$V \approx 25.1\ m^3$

Example 4: Find the height of the cone. Round to the nearest tenth.



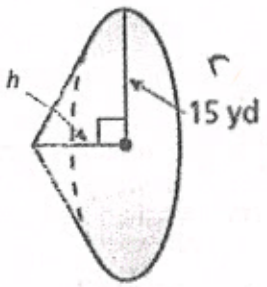
Volume = 956 ft³

$V = \frac{1}{3}Bh$	Write formula for volume.
$V = \frac{1}{3}(\pi r^2)h$	Substitute the area of a circle formula in for B.
$956 = \frac{1}{3}(\pi(9)^2)(h)$	Substitute 956 for V and 9 for radius.
$956 = 27\pi h$	Multiply.
$\frac{956}{27} = \frac{27\pi h}{27}$	Divide both sides by 27.
$\frac{35.4074}{\pi} = \frac{\pi h}{\pi}$	Divide both sides by π.
$h \approx 11.27$	Round.

$h \approx 11.3\ feet$

Try This:

b. Find the height of the cone. Round to the nearest tenth.



Volume = 7200 yd³

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

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

$7200 = \frac{1}{3}\pi(15)^2 h$

$7200 = \frac{1}{3}\pi(225)h$

$\frac{7200}{75} = \frac{75\pi h}{75}$

$\frac{96}{\pi} = \frac{\pi h}{\pi}$

$30.55 \approx h$

$h \approx 30.6$ yd