8.7 Lesson

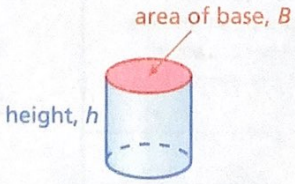
$V = \pi r^2 \cdot h$

Key Idea

Volume of a Cylinder

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

Algebra $V = Bh$ * Volume is units^3



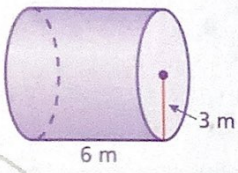
B is area of base which is a circle so πr^2 then multiply by height

Example 1 Finding Volumes of Cylinders

Find the volume of each cylinder.

$3^2 \cdot \pi$
9π
$28.26 \cdot 6$
169.56m3

a.



$4^2 \cdot \pi$
16π
$50.24 \cdot 8$
401.92ft3

b.

Because $B = \pi r^2$, you can use $V = \pi r^2 h$ to find the volume of a cylinder.

$V = Bh$	Write volume formula.	
$= \pi(3)^2(6)$	Substitute.	
$= 54\pi$	Simplify.	
≈ 169.6	Use 3.14 for π.	

▶ The volume is $54\pi \approx 169.6$ cubic meters.

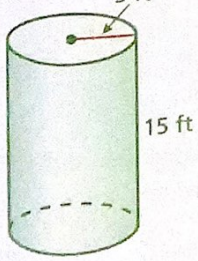
$V = Bh$	
$= \pi(4)^2(8)$	
$= 128\pi$	
≈ 401.9	

▶ The volume is $128\pi \approx 401.9$ cubic feet.

Try It

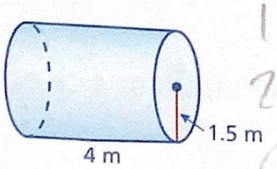
Find the volume of the cylinder.

1.



$5^2 \cdot \pi \cdot 15$
$25 \cdot \pi \cdot 15$
1177.5ft3

2.



$1.5^2 \cdot \pi \cdot 4$
$2.25 \cdot \pi \cdot 4$
28.26m3

GO DIGITAL

Example 2 Finding the Height of a Cylinder

6 MTR ASSESS REASONABLENESS

How can you use a 4 in. × 10 in. × 10 in. rectangular prism to check whether your answer in Example 2 is reasonable?

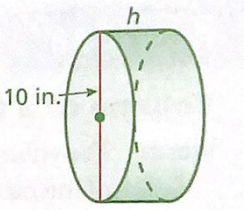
_____

_____

_____

Find the height of the cylinder.

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



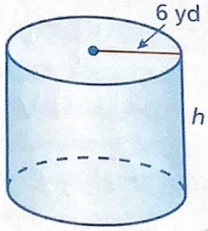
Volume = 314 in.^{3}

$V = Bh$	Write the formula for volume.
$314 = \pi(5)^2(h)$	Substitute.
$314 = 25\pi h$	Simplify.
$4 \approx h$	Divide each side by 25π.

▶ The height is about 4 inches.

Try It **Find the height of the cylinder.**

3.



Volume = 1130 yd^3

$1130 = 6^2 \cdot \pi \cdot h$

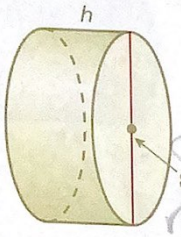
$36 \cdot \pi \cdot h$

$1130 = 113.04h$

$\div 113.04 \quad \div 113.04$

$9.99 = h$

4.



Volume = 176 cm^3

$176 = 16 \cdot \pi \cdot h$

$176 = 50.24h$

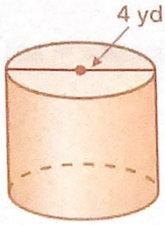
$\div 50.24 \quad \div 50.24$

$3.5 = h$

$r = 4$

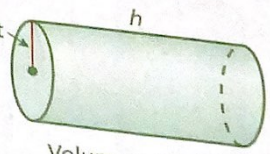
In-Class Practice

1 I don't understand yet. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.



5. FINDING THE VOLUME OF A CYLINDER Find the volume of the cylinder at the left.

6. FINDING THE HEIGHT OF A CYLINDER Find the height of the cylinder at the right.



Volume = 340 ft^3

$V = \pi r^2 \cdot h$

$340 = \pi \cdot 9 \cdot h$

$\div \pi \quad \div \pi$

$108.28 = 9 \cdot h$

$\div 9 \quad \div 9$

$12.03 = h$

GO DIGITAL