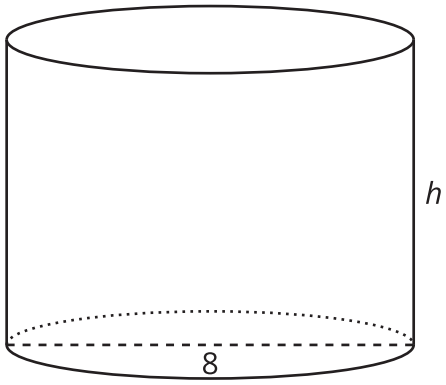
Finding Cylinder Dimensions

Let's figure out the dimensions of cylinders.

12.1 A Cylinder of Unknown Height

What is a possible volume for this cylinder if the diameter is 8 cm? Explain your reasoning.

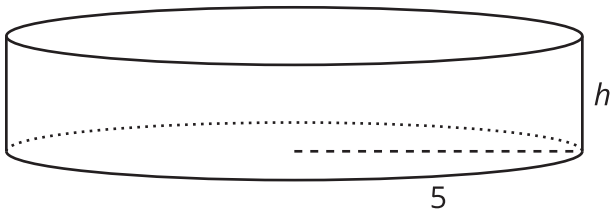


12.2 What's the Dimension?

The volume V of a cylinder with radius r is given by the formula $V = \pi r^2 h$.

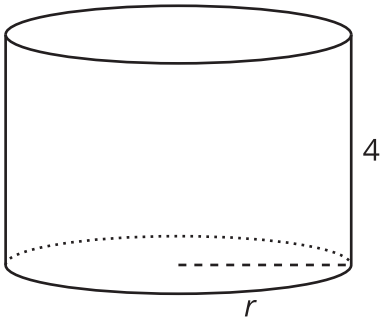
1. The volume of this cylinder with radius 5 units is 50π cubic units.
   This statement is true: $50\pi = 5^2 \pi h$.

   What does the height of this cylinder have to be? Explain how you know.



2. The volume of this cylinder with height 4 units is 36π cubic units.
   This statement is true: $36\pi = r^2 \pi 4$.

   What does the radius of this cylinder have to be? Explain how you know.



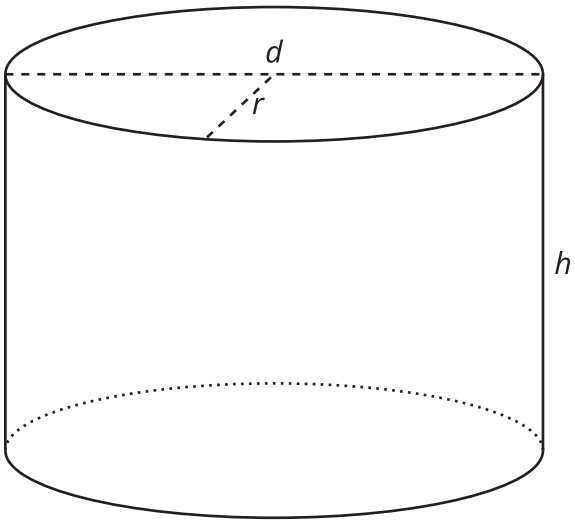
Are you ready for more?

Suppose a cylinder has a volume of 36π cubic inches, but it is not the same cylinder as the one you found earlier in this activity.

1. What are some possibilities for the dimensions of the cylinder?

2. How many different cylinders can you find that have a volume of 36π cubic inches?

12.3 Cylinders with Unknown Dimensions



Each row of the table has information about a particular cylinder. Complete the table with the missing dimensions.

	diameter (units)	radius (units)	area of the base (square units)	height (units)	volume (cubic units)
a		3		4	
b	12				108π
c				8	72π
d	10				25π
e				100	16π
f		10			20π
g	20				100π
h				k	$\pi \cdot k \cdot j^2$

Lesson 12 Summary

In an earlier lesson we learned that the volume V of a cylinder with radius r and height h is

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

We say that the volume depends on the radius and height, and if we know the radius and height, we can find the volume. It is also true that if we know the volume and one dimension (either radius or height), we can find the other dimension.

For example, imagine a cylinder that has a volume of 500π cm^3 and a radius of 5 cm, but the height is unknown. From the volume formula we know that

$$500\pi = \pi \cdot 25 \cdot h$$

must be true. Looking at the structure of the equation, we can see that $500 = 25h$. That means that the height has to be 20 cm, since $500 \div 25 = 20$.

Now imagine another cylinder that also has a volume of 500π cm^3 with an unknown radius and a height of 5 cm. Then we know that

$$500\pi = \pi \cdot r^2 \cdot 5$$

must be true. Looking at the structure of this equation, we can see that $r^2 = 100$. So the radius must be 10 cm.