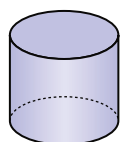


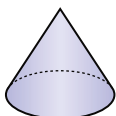
## Practice

1. The cylinder and cone in each pair have the same base and height.  
The volume of each cylinder is given. Determine the volume of each cone.

a)

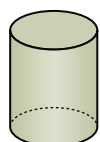


$$V = 42 \text{ cm}^3$$

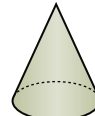


$$V = ?$$

b)



$$V = 19.2 \text{ cm}^3$$



$$V = ?$$

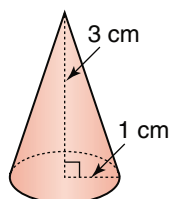
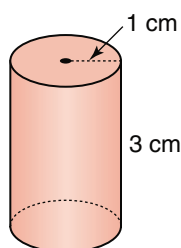
Need Help?

Read Connect the Ideas.

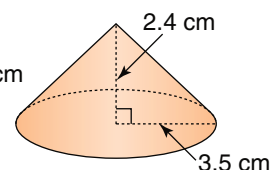
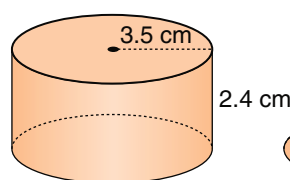


2. The cylinder and cone in each pair have the same base and height.  
Determine each volume.

a)

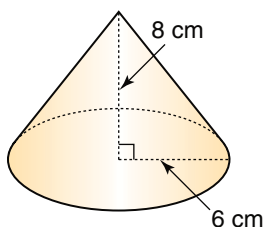


b)

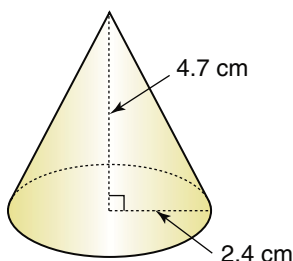


3. Determine the volume of each cone.

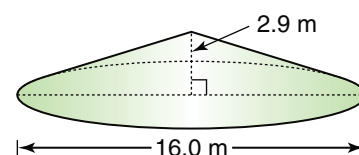
a)



b)



c)

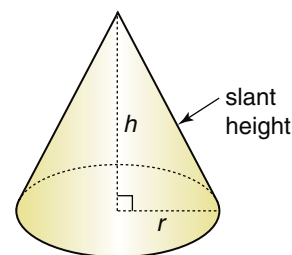


4. An ice-cream cone has diameter 6 cm and height 12 cm.  
What is the volume of the cone? Justify your answer.

Sometimes the height of a cone is not given.

We can measure the **slant height** and radius,

then use the Pythagorean Theorem to calculate the height.



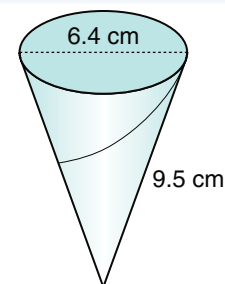
## Example

A paper drinking cup is a cone.

The base has diameter 6.4 cm.

The slant height is 9.5 cm.

- Determine the height of the cone.
- Determine the volume of water that will fill the cup.



**Solution**

- a) The radius of the cone is:  $r = \frac{6.4 \text{ cm}}{2} = 3.2 \text{ cm}$

Use the Pythagorean Theorem:

$$h^2 + 3.2^2 = 9.5^2$$

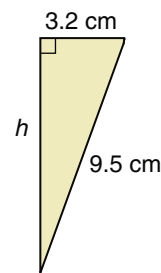
$$h^2 + 10.24 = 90.25$$

$$h^2 = 90.25 - 10.24$$

$$h^2 = 80.01$$

$$h = \sqrt{80.01}$$

$$h \doteq 8.945$$



The cone is about 9 cm high.

- b) The volume of water the cone will hold is equal to the volume of the cone.

$$\text{Use: } V = \frac{1}{3} \pi r^2 h$$

Substitute:  $r = 3.2$  and  $h = 8.945$

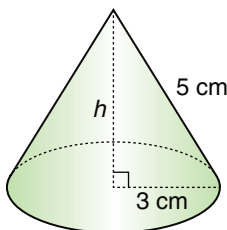
$$V = \frac{1}{3} \times \pi \times 3.2^2 \times 8.945$$

$$V \doteq 95.92$$

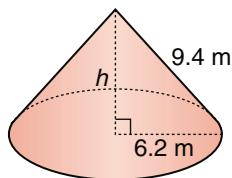
The volume of water is about  $96 \text{ cm}^3$ .

5. Determine the height and volume of each cone.

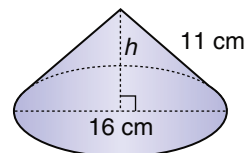
a)



b)



c)



6. **Assessment Focus** A pile of sand is a cone.

The base diameter is 3.8 m and the slant height is 4.0 m.

- a) What is the volume of sand in the pile? Include a diagram.  
b) How do you know your answer is reasonable?

7. **Take It Further** A hill can be approximated as a cone.

Its circumference is about 3 km. Its slant height is about 800 m.

What is the approximate volume of soil in the hill?

Recall that  
 $1 \text{ km} = 1000 \text{ m}$ .

**In Your Own Words**

How is the volume of a cone related to the volume of a cylinder?  
Include diagrams in your explanation.