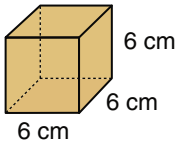
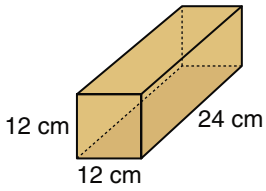
Practice

1. Determine the volume of each prism.

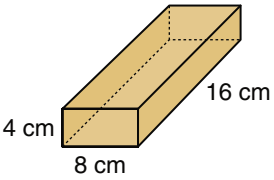
a)



b)

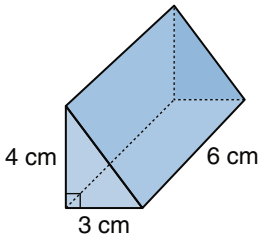


c)

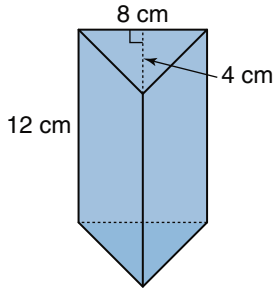


2. Determine the volume of each prism.

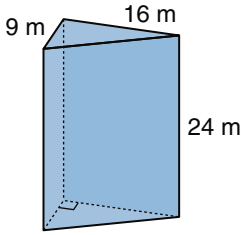
a)



b)



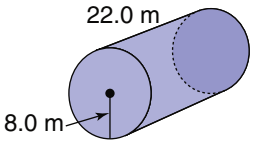
c)



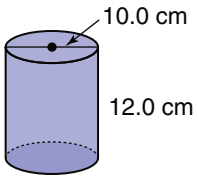
Need Help?
Read Connect the Ideas.

3. Determine the volume of each cylinder.

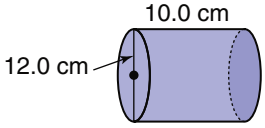
a)



b)



c)



4. Pasta is sold in a box that is a rectangular prism.
The box that feeds 4 people measures 3 cm by 9 cm by 18 cm.

a) What is the volume of this box?

b) The company wants to produce a party-pack box of pasta.
Each dimension of the box will be doubled.
Will this be enough pasta for 16 people? Justify your answer.

5. Assessment Focus Hay bales come in different shapes and sizes.
Some are rectangular prisms. Others are cylindrical.
A rectangular bale is 75 cm by 20 cm by 14 cm.
A cylindrical bale has base diameter 150 cm and length 120 cm.

a) Sketch each bale. Which has the greater volume? Justify your answer.

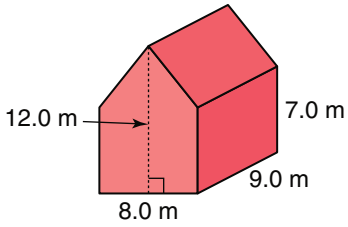
b) About how many of the smaller bales have a total volume equal to that of the larger bale?

6. a) What is the volume of this barn?

b) Would this barn hold 1000 of the rectangular hay bales in question 5? How do you know?

c) Would this barn hold 1000 of the cylindrical hay bales in question 5? How do you know?

d) Are your results reasonable? Explain.

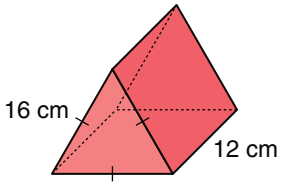


Sometimes we need to use the Pythagorean Theorem to calculate a length on a prism, before we find its volume.

Example

a) Determine the height of the base of this prism.

b) Determine the volume of this prism.



Solution

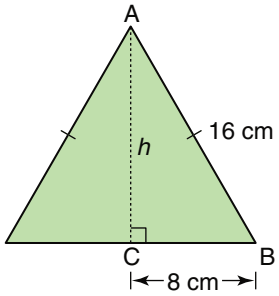
A base of a prism is not necessarily the bottom face.

a) Sketch the triangular base.

Let the height of the triangle be h.

The height bisects the base of the triangle.

Use the Pythagorean Theorem in $\triangle ABC$.



$$h^2 + 8^2 = 16^2$$
$$h^2 + 64 = 256$$
$$h^2 = 256 - 64$$
$$h^2 = 192$$
$$h = \sqrt{192}$$
$$h \doteq 13.86$$

The height of the base is about 14 cm.

b) The base area is: $\frac{1}{2} \times 16 \times 13.86 = 110.88$

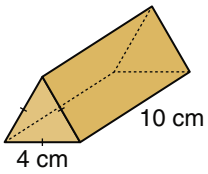
The length is: 12 cm

The volume is: base area $\times$ length $= 110.88 \times 12$
$= 1330.56$

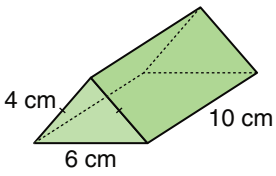
The volume of the prism is about 1331 cm^3.

7. A child's building block set has these triangular prisms. Determine the volume of wood in each block.

a) Equilateral triangular prism



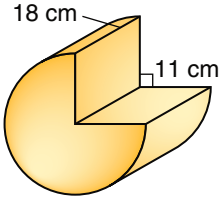
b) Isosceles triangular prism



8. **Take It Further** Many types of cheese are produced in cylindrical slabs. One-quarter of this slab has been sold.

a) What is the volume of this piece of cheese?

b) The mass of 1 cm^3 of cheese is about 1.2 g. What is the mass of the cheese shown here?



In Your Own Words

Why can you use the same formula to calculate the volumes of a prism and a cylinder? Include examples in your explanation.