

What we learned about VOLUME:

in^3 ft^3 mi^3 cm^3

- how much space an object takes up
- amount of CUBES that fit inside.

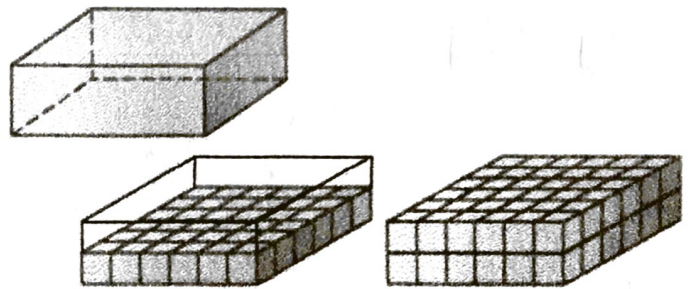
* Story of paper lanterns.

Fill it up!

Start Flat & Pull it OPEN! *

VOCABULARY

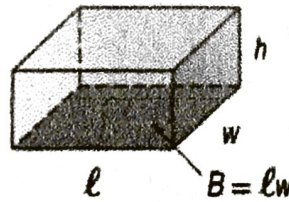
The **volume** of a three-dimensional figure is the measure of space it occupies. It is measured in cubic units such as cubic centimeters (cm^3) or cubic inches (in^3).



Volume of a Rectangular Prism

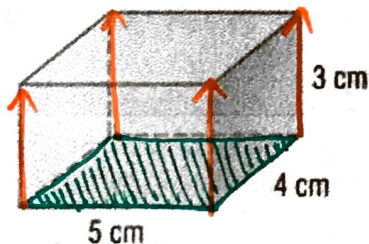
Words The volume V of a rectangular prism is the product of the length ℓ , the width w , and the height h . It is also the area of the base B times the height h .

Model



Symbols $V = \ell w h$ or $V = B h$
 $V = \text{Area of Base} \cdot h$

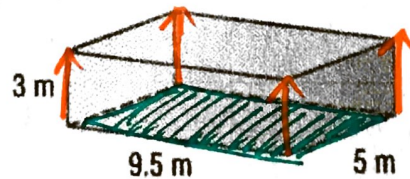
Ex. 1: a)



$$V = \ell \cdot w \cdot h$$

$$V = 60 \text{ cm}^3$$

b)



$$V = \ell \cdot w \cdot h$$

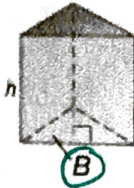
$$V = 9.5 \cdot 5 \cdot 3$$

$$V = 142.5 \text{ m}^3$$

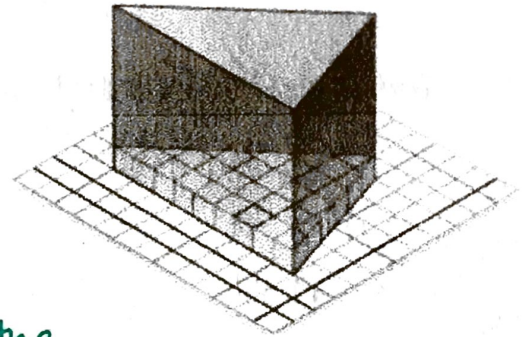
Volume of a Triangular Prism

Words The volume V of a triangular prism is the area of the base B times the height h .

Model

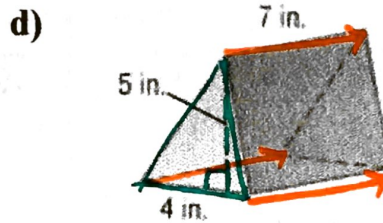
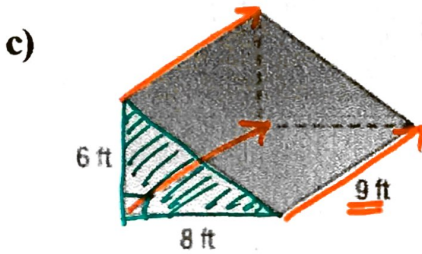


Symbols $V = Bh$, where B is the area of the base.



ALWAYS START with the triangle!

Ex. 2: Volume of Triangular Prisms



① Find the area of the Base

$$\frac{b \cdot h}{2} = \frac{6 \cdot 8}{2} = 24$$

$$B = \frac{5 \cdot 4}{2} = 10 \cdot 7 = \boxed{70 \text{ in}^3 = V}$$

② Multiply by the height of the prism.

$$24 \cdot 9 = \boxed{216 \text{ ft}^3 = V}$$

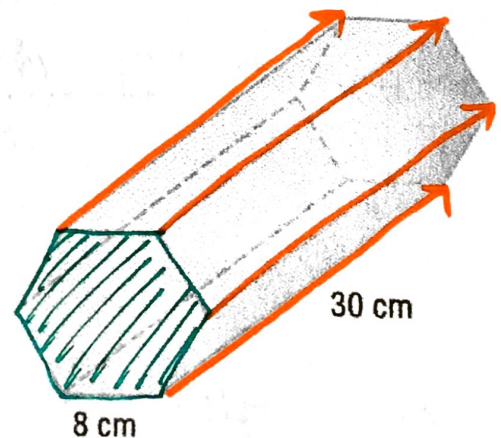
Ex. 3: Volume of any Prism

e) The base of the prism shown is a regular hexagon with side lengths of 8 centimeters. The area of one of its bases is about 166 cm^2 . What is the volume of this hexagonal prism?

$$V = B \cdot h$$

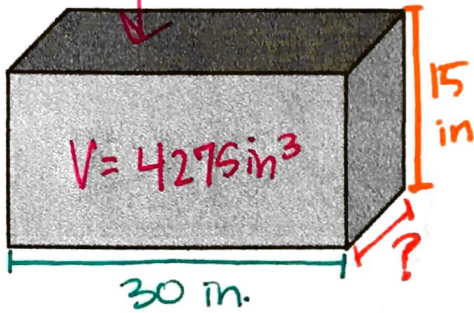
$$V = 166 \cdot 30 = \boxed{4980 \text{ cm}^3}$$

Area of Base height of prism



Ex. 4 *start with formula & work backwards!*

A. The rectangular prism below has a height of 15 inches, a length of 30 inches, and a total volume of 4,275 cubic inches. What is the width of the prism?



Buzzle.com

$$V = l \cdot w \cdot h$$

$$4275 = 30 \cdot w \cdot 15 \quad \text{multiply}$$

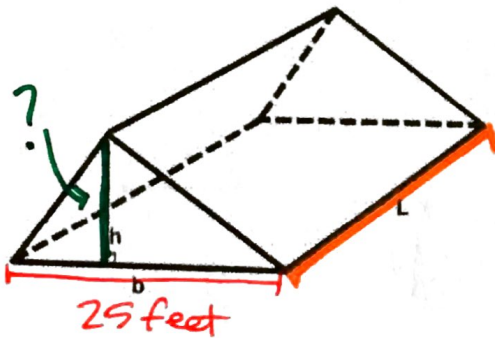
$$\frac{4275}{450} = \frac{450 \cdot w}{450}$$

$$9.5 = w$$

The width of the prism is 9.5 inches.

B. The triangular prism below has a base that measures 25 feet, and the length of the prism is 45 feet. What is the height of the prism?

$$V = 4275 \text{ ft}^3$$



$$V = B \cdot L$$

Area of Base

length of prism (distance from 1 Δ to the other)

$$V = \frac{b \cdot h}{2} \cdot L$$

$$4275 = \frac{25 \cdot h \cdot 45}{2} \quad \text{Multiply top}$$

$$4275 = \frac{1125 \cdot h}{2} \quad \text{Divide #'s}$$

$$\frac{4275}{562.5} = \frac{562.5 \cdot h}{562.5} \quad \text{solve for h}$$

$$7.6 = h$$

The height of the triangle is 7.6 feet.