Geometry 12.4
Find volumes of prisms*
Find volumes of cylinders**

*6th grade standard
**8th grade standard

Quiz 12.1-12.2

$B \cdot h$

volume (capacity) how does it hold?

units cubic

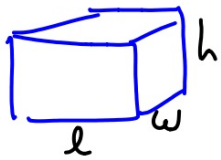
composite solid

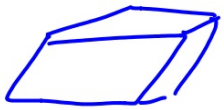
oblique

Cavalieri's principle deck of cards

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

$V = (B)h$

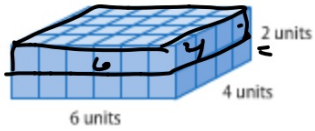




1 Volume of Prisms

Recall that the volume of a solid is the measure of the amount of space the solid encloses. Volume is measured in cubic units.

The rectangular prism at the right has 6 • 4 or 24 cubic units in the bottom layer. Since there are two layers, the total volume is 24 • 2 or 48 cubic units.

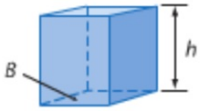


KeyConcept Volume of a Prism

Words The volume V of a prism is $V = Bh$, where B is the area of a base and h is the height of the prism.

Symbols $V = Bh$

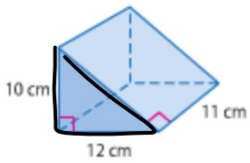
Model



Which part is the base?

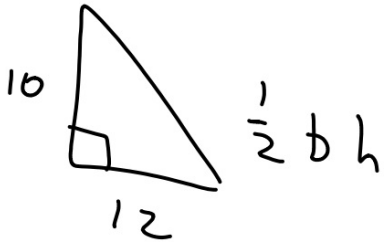
Example 1 Volume of a Prism

Find the volume of the prism.



$V = \frac{(60)(11)}{2}$

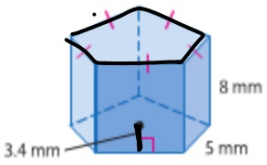
$660\ cm^3$



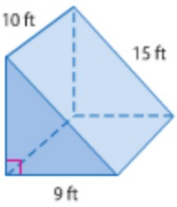
$\frac{1}{2}bh$

GuidedPractice

1A.

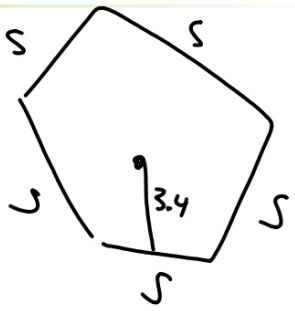


1B.



$V = (42.5)(8)$

$V = 340\ mm^3$



$A = \frac{1}{2}ap$

$= \frac{1}{2}(34)25$

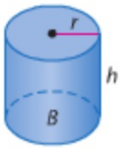
$= 42.5$

KeyConcept Volume of a Cylinder

Words The volume V of a cylinder is $V = Bh$ or $V = \pi r^2 h$, where B is the area of the base, h is the height of the cylinder, and r is the radius of the base.

Symbols $V = Bh$

Model



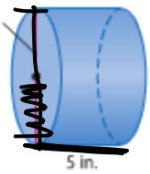
circle

( )( )

Example 2 Volume of a Cylinder

Find the volume of the cylinder at the right.

$r = 4.5$



$$V = (\pi \cdot 4.5^2)(5)$$

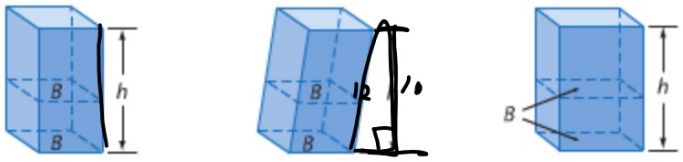
$$= 318.1 \text{ in}^3$$

We can find volumes of oblique prisms/cylinders

KeyConcept Cavalieri's Principle

Words If two solids have the same height h and the same cross-sectional area B at every level, then they have the same volume.

Models

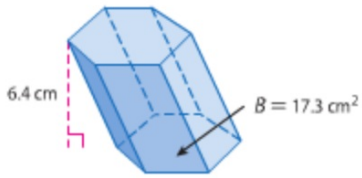


These prisms all have a volume of Bh.

Javier Larrea/age fotostock

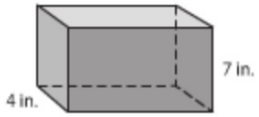
Example 3 Volume of an Oblique Solid

Find the volume of an oblique hexagonal prism if the height is 6.4 centimeters and the base area is 17.3 square centimeters.

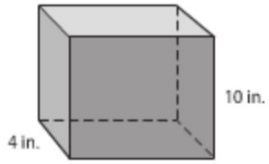


Standardized Test Example 4 Comparing Volumes of Solids

Prisms A and B have the same length and width, but different heights. If the volume of Prism B is 150 cubic inches greater than the volume of Prism A, what is the length of each prism?



Prism A

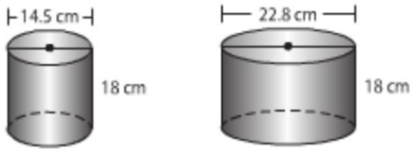


Prism B

A 10 in. **B** $11\frac{1}{2}$ in. **C** 12 in. **D** $12\frac{1}{2}$ in.

GuidedPractice

4. The containers at the right are filled with popcorn. About how many times as much popcorn does the larger container hold?



F 1.6 times as much

G 2.5 times as much

H 3.3 times as much

J 5.0 times as much