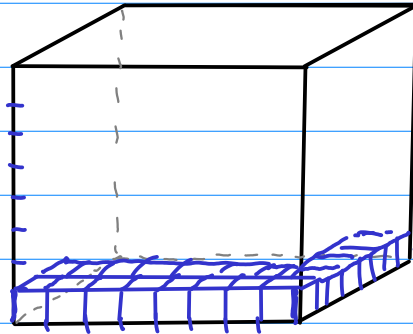


## §10.1: Volume of Prisms

3D shape  
↓

\* Volume: a measure of how much space fits inside a solid.

Ex: 8" cube  
8" x 8" x 8"



# cubes on 1st floor:  
8 cubes/row

x 8 rows

64 cubes/floor

x 8 floors

512 1" cubes

512 cubic inches

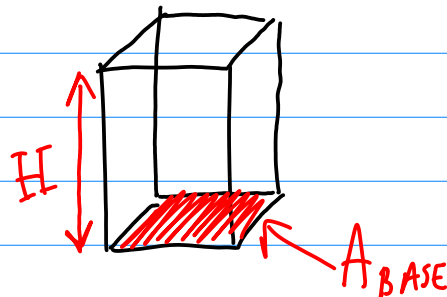
512 in<sup>3</sup>



1 cubic inch

1 in<sup>3</sup>

\*  $V_{\text{PRISM}} = A_{\text{BASE}} \cdot H$



Ex: Find the volume of a rectangular prism w/dimensions 8' x 10' x 12'.

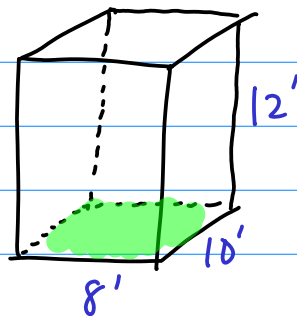
$$V_{\text{PRISM}} = A_{\text{BASE}} \cdot H$$

$$= bh \cdot H$$

$$= (8')(10') \cdot (12')$$

$$= 960 \text{ ft} \cdot \text{ft} \cdot \text{ft}$$

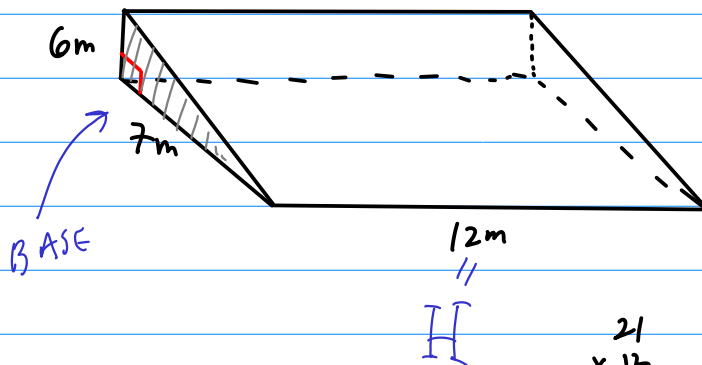
$$= 960 \text{ ft}^3 = 960 \text{ cubic ft}$$



Ex: Find the volume of a rect. prism measuring 8.5 cm x 3 cm x 10 cm.

$$\begin{aligned}
 V_{\text{PRISM}} &= A_{\text{BASE}} \cdot H \\
 &= b \cdot h \cdot H \\
 &= (8.5 \text{ cm})(3 \text{ cm}) \cdot 10 \text{ cm} \\
 &= 85 \text{ cm}^2 \cdot 3 \text{ cm} \\
 &= 255 \text{ cm}^3 = 255 \text{ cubic cm} = 255 \text{ cc}
 \end{aligned}$$

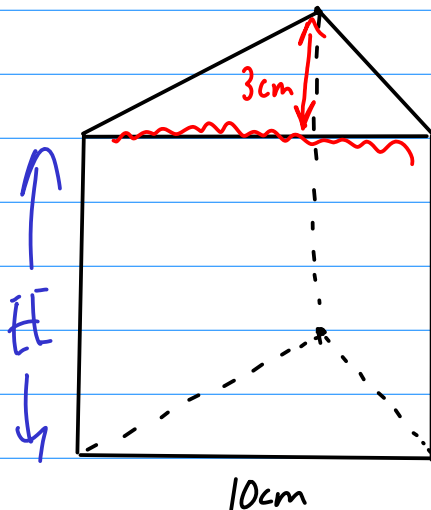
Ex: TRIANGULAR PRISM:  $V = ?$



$$\begin{aligned}
 V_{\text{PRISM}} &= A_{\text{BASE}} \cdot H \\
 &= \frac{1}{2} b h \cdot H \\
 &= \frac{1}{2} (7 \text{ m})(6 \text{ m}) \cdot (12 \text{ m}) \\
 &= 21 \text{ m}^2 \cdot 12 \text{ m} \\
 &= \boxed{252 \text{ m}^3}
 \end{aligned}$$

$$\begin{array}{r}
 21 \\
 \times 12 \\
 \hline
 42 \\
 210 \\
 \hline
 252
 \end{array}$$

Ex:



$V = 165 \text{ cm}^3$ . Find the prism's height.  $H = ?$

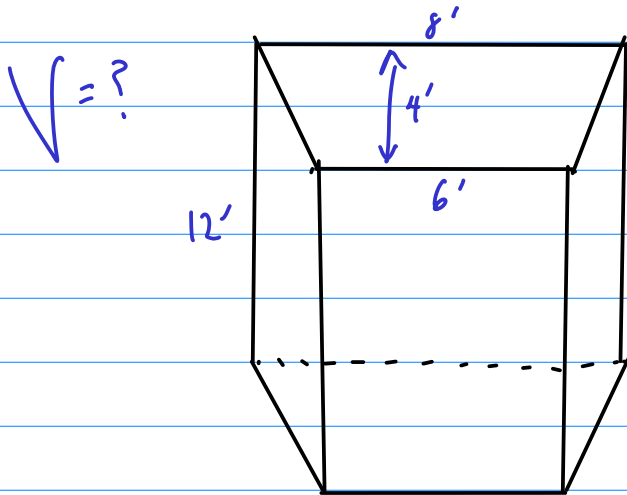
$$\begin{aligned}
 V_{\text{PRISM}} &= A_{\text{BASE}} \cdot H \\
 \boxed{V_{\text{PRISM}}} &= \frac{1}{2} b h \cdot H
 \end{aligned}$$

$$165 = \frac{1}{2} \cdot 10 \cdot 3 \cdot H$$

$$\frac{165}{15} = \frac{15 \cdot H}{15}$$

$$\boxed{11 \text{ cm} = H}$$

Ex: TRAPEZOIDAL PRISM (Ex: gold brick)



$$\begin{aligned} V_{\text{PRISM}} &= A_{\text{BASE}} \cdot H \\ &= \left( \frac{b_1 + b_2}{2} \right) h \cdot H \\ &= \left( \frac{8 + 6}{2} \right) (4)(12) \end{aligned}$$

$$\begin{array}{r} 28 \\ \times 12 \\ \hline 56 \\ 280 \end{array}$$

$$\begin{aligned} &= \left( \frac{14}{2} \right) (4)(12) \\ &= (7)(4)(12) \\ &= \boxed{336 \text{ ft}^3} \end{aligned}$$