U1D4_T Volume_Prisms_Cyl

Friday, September 7, 2018 12:57 PM

U1D4_T Volume_...

U1D4 MAP4CI

Volume of Prisms and Cylinders

Polyhedron: A three-dimensional object with faces that are polygons.

Prism:
A prism is a three-dimensional solid (a polyhedron). The top and bottom (the bases) are parallel, identical polygons. The lateral faces are rectangles; they meet the bases at right angles. A prism is named by the shape of its bases, for example, rectangular prism, triangular prism, square-based prism.

Volume of any Prism: $V = A_{base} \times \text{height}$

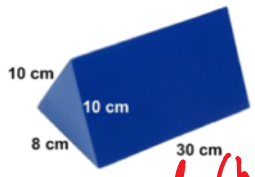
NOTE: We usually tip triangular prisms on their sides and call the height the length.

The formula for the volume of a cylinder is the same as a prism.

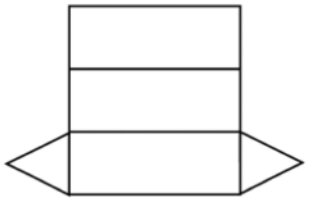
Volume of Cylinder: $V = A_{base} \times \text{height}$

$$V = \pi r^2 h$$

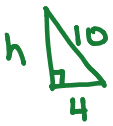
Example 1: Calculate the volume of the following triangular-based prism.



l (height of prism)



$b = 8$



$h^2 = 10^2 - 4^2$

$h^2 = 100 - 16$

$h^2 = 84$

$h = \sqrt{84}$

$h \doteq 9.165$

$V = b \times h \div 2 \times l$

$V = 8 \times \sqrt{84} \div 2 \times 30$

$V \doteq 1099.8 \text{ cm}^3$

Example 2: **:** A can of soup has a volume of 375 mL. If the height of the can is 12 cm determine the radius of the can. (Note: 1 mL = 1cm^3)

$V = 375\,cm^3$

$h = 12\,cm$

$V_{cylinder} = \pi r^2 h$

$375 = \pi r^2 (12)$

$\frac{375}{12\pi} = \frac{12\pi r^2}{12\pi}$

$375 \div (12\pi)$

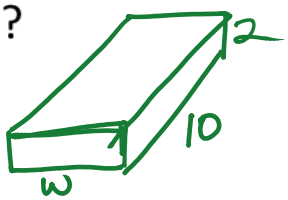
$375 \div 12 \div \pi = r^2$

$r^2 = 9.947...$

$\boxed{r \doteq 3.15\,cm}$

$\therefore$ the radius is about 3.15 cm.

Example 3: A box of chocolates has a volume of 80 cm^3. If its length is 10 cm and its height is 2 cm, what is its width?



$V = 80cm^3$

$V = lwh$

$80 = 10w(2)$

$80 = 20w$

$\frac{80}{20} = \frac{20w}{20}$

$4 = w$

$\therefore$ the width is 4 cm.

$V = 80$
$l = 10$
$h = 2$