

Volume

Volume of a Cylinder

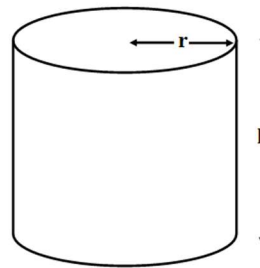
A **cylinder** (Greek: cyl-in-der) is a three-dimensional shape with two circular bases.

To find the volume, multiply the area of the base by the height.

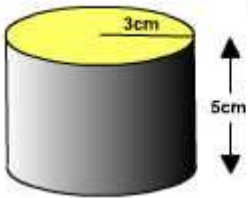
Volume is measured in **cubic units** (Example: cu.ft. or ft³)

Formula:

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



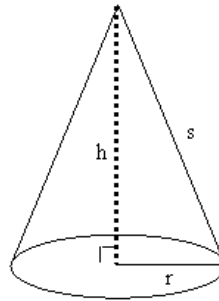
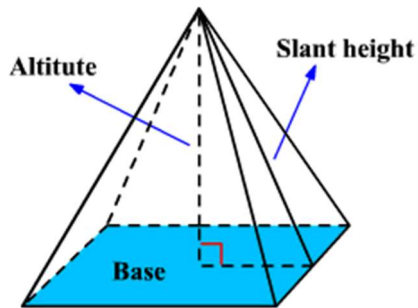
Example:



$$\begin{aligned}\text{Volume} &= \pi r^2 h \\ &= \pi \times 3^2 \times 5 \\ &= \pi \times 9 \times 5 \\ &= 141.37 \text{ cm}^3\end{aligned}$$

Volume of a Pyramid and Cone

Both pyramids and cones have an **altitude (height)** that is the distance of a perpendicular line segment which goes from the base to the highest point where the faces meet (**vertex**). These figures also have a **slant height** which is the height of one of the faces.

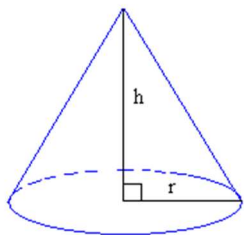


Formula: $V = \frac{1}{3} \cdot B \cdot h$

where B is the **area of the base** and h is the **height**

Volume is measured in cubic units.

Examples:



$$h = 4$$

$$r = 7$$

$$V = \frac{1}{3} \pi r^2 h$$

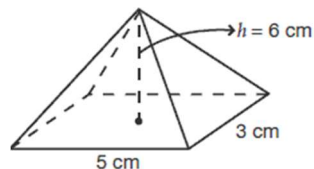
$$= \frac{1}{3} \pi \cdot 7^2 \cdot 4$$

$$= \frac{1}{3} \pi \cdot 49 \cdot 4$$

$$= \frac{1}{3} \pi \cdot 196$$

$$= \frac{1}{3} 615.8$$

$$V = 205.3$$



$$V = \frac{1}{3} lwh$$

$$V = \frac{1}{3} (5)(3)(6)$$

$$V = 30 \text{ cm}^3$$