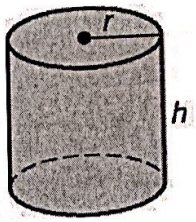
Volume of Cylinders, Pyramids, Spheres, and Cones

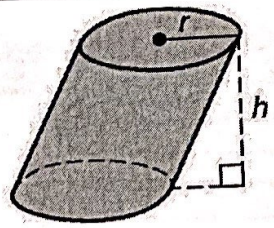
Volume of a Cylinder

The volume of a cylinder with radius r, and height h is

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



Right Cylinder



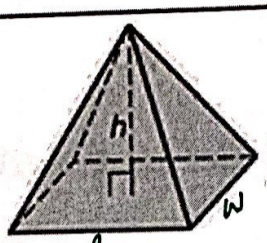
Oblique Cylinder

Volume of a Pyramid

The volume of a pyramid with base area B and height h is

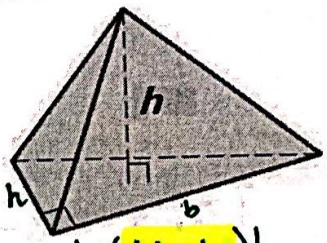
$$V = \frac{1}{3}Bh.$$

Base Area



$V = \frac{1}{3}(l \cdot w)h$

area of a rectangle



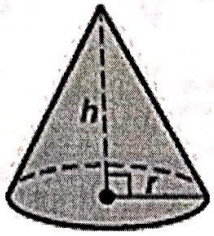
$V = \frac{1}{3}\left(\frac{1}{2}b \cdot h\right)h$

area of a triangle

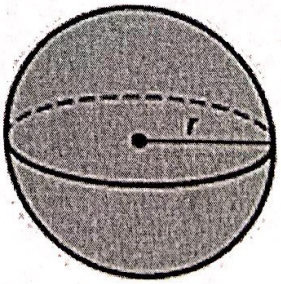
Volume of a Cone

The volume of a cone with radius r, and height h is

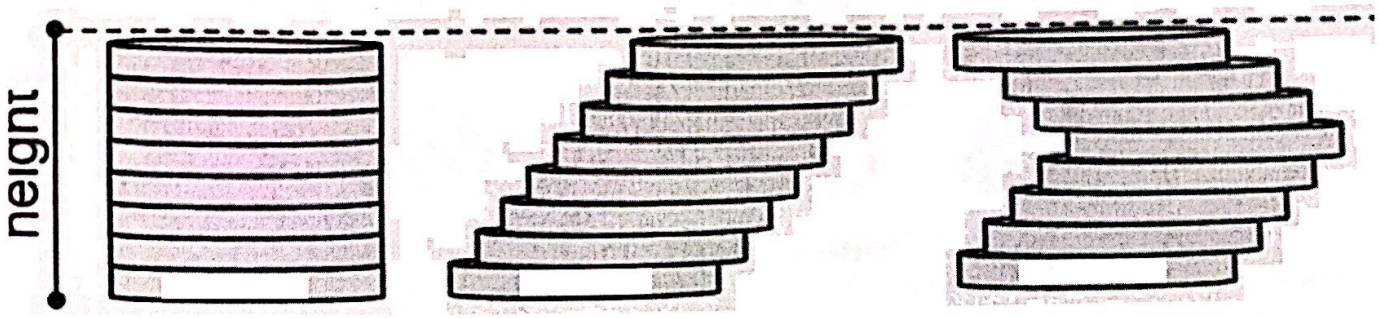
$$V = \frac{1}{3}\pi r^2 h$$



Volume of a Sphere

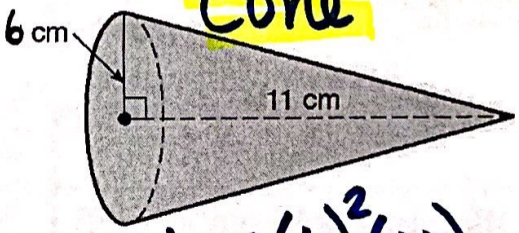
Volume	The volume of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.	
Surface Area	The surface area of a sphere with radius r is $S = 4\pi r^2$.	

Cavalieri's Principle: "If the cross sections of a cylinder have the same area and the cylinders have the same height, then the cylinders also have the same volume."



Name the shape. Then find the volume of each.

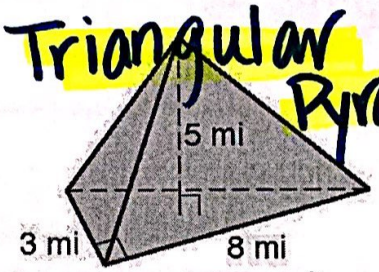
Cone



$V = \frac{1}{3}\pi(6)^2(11)$

$V \approx 414.7 \text{ cm}^3$

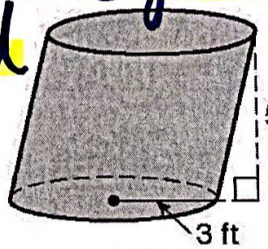
Triangular Pyramid



$V = \frac{1}{3}\left(\frac{1}{2} \cdot 3 \cdot 8\right)5$

$V \approx 20 \text{ mi}^3$

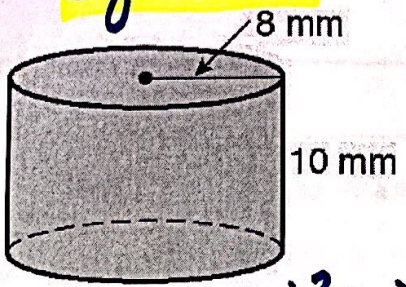
Cylinder



$V = \pi(3)^2(5)$

$V \approx 141.4 \text{ ft}^3$

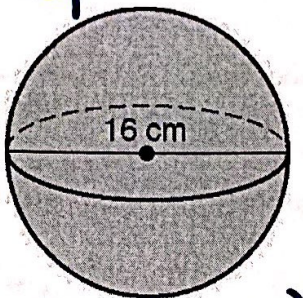
cylinder



$V = \pi(8)^2(10)$

$V \approx 201.6 \text{ mm}^3$

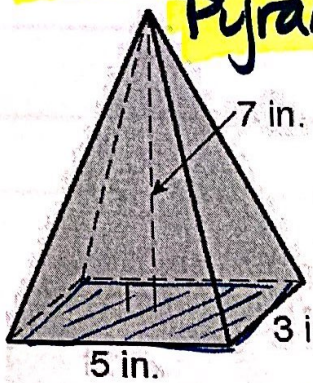
Sphere



$V = \frac{4}{3}\pi(8)^3$

$V \approx 2144.7 \text{cm}^3$

Rectangular Pyramid



$V = \frac{1}{3}(5 \cdot 3)7$

$V = 35 \text{ in}^3$