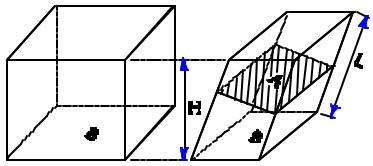
Surfaces\Volumes of Solids

Nomenclature

S Lateral surface area
V Volume
A Area of section perpendicular to sides
B Area of base
P Perimeter of base
P_A Perimeter of section perpendicular to its sides
R Radius of sphere or circle
L Slant height or lateral length
H Perpendicular Height
C Circumference of circle or sphere

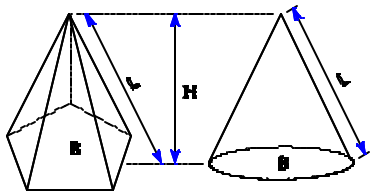
Parallelepiped



$S = PH$ $\qquad$ $S = P_A L$

$V = BH = AL$

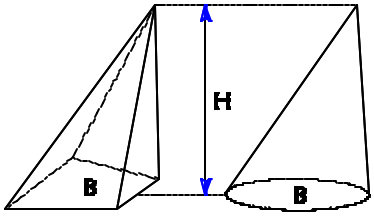
Pyramid or Cone
Right or Regular



$S = \frac{1}{2}PL$ $\qquad$ $V = \frac{1}{3}BH$

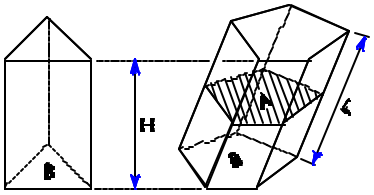
Surfaces\Volumes of Solids

Pyramid or Cone, Right or Oblique, Regular or Irregular



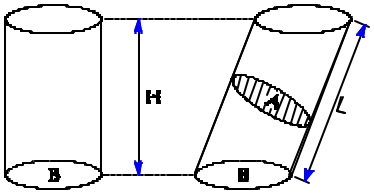
$$V = \frac{1}{3}BH$$

Prism: Right or Oblique, Regular or Irregular



$S = PH = P_A L$ $\qquad$ $V = BH = AL$

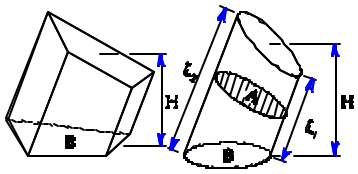
Cylinder: Right or Oblique, Circular or Elliptic



$S = PH = P_A L$ $\qquad$ $V = BH = AL$

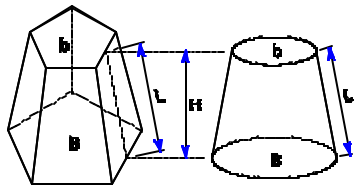
Surfaces\Volumes of Solids

Frustum of any Prism or Cylinder



$$V = BH \qquad V = \frac{1}{2}A\left(L_2 + L_1\right)$$

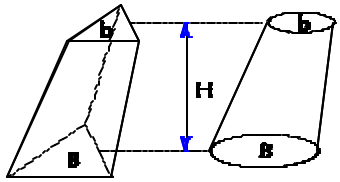
Frustum of Pyramid or Cone Right and Regular, Parallel Ends



$$S = \frac{1}{2}L\left(P + p\right) \qquad V = \frac{1}{3}H\left(B + b + \sqrt{Bb}\right)$$

p = perimeter of top **b** = area of top

Frustum of any Pyramid or Cone, with Parallel Ends

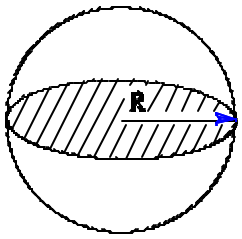


$$V = \frac{1}{3}H\left(B + b + \sqrt{Bb}\right)$$

b = area of top

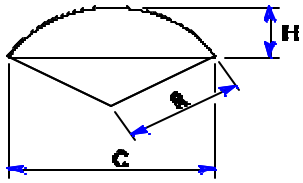
Surfaces\Volumes of Solids

Sphere



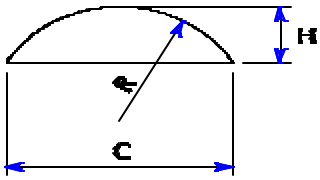
$$S = 4pR^2 \qquad V = \frac{4}{3}pR^3$$

Spherical Sector



$$S = \frac{1}{2}pR(4H + C) \qquad V = \frac{2}{3}pR^2H$$

Spherical Segment

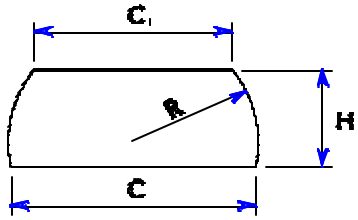


$$S = 2pRH = \frac{1}{4}p\left(4H^2 + C^2\right)$$

$$V = \frac{1}{3}pH^2(3R - H)$$

Surfaces\Volumes of Solids

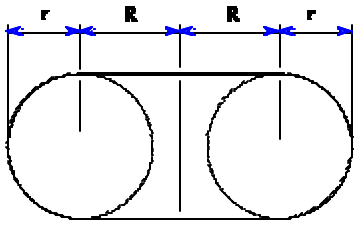
Spherical Zone



$$S = 2pRH$$

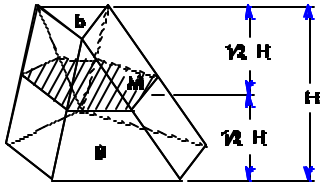
$$V = \frac{1}{24}pH\left(3C_1^2 + 3C^2 + 4H^2\right)$$

Circular Ring



$$S = 4p^2Rr \qquad V = 2p^2Rr^2$$

Prismoidal Formula



$$V = \frac{H}{6}(B + b + 4M)$$

M = Area of section parallel to bases, Midway between them

b = area of top