3-D Figures:

Prism: $V = Bh$

Pyramid: $V = \frac{1}{3}Bh$

Cylinder: $V = \pi r^2 h$; $SA = 2\pi rh + 2\pi r^2$

Cone: $V = \frac{1}{3}\pi r^2 h$; $SA = s\pi r + \pi r^2$

Sphere: $V = \frac{4}{3}\pi r^3$; $SA = 4\pi r^2 = \pi d^2$

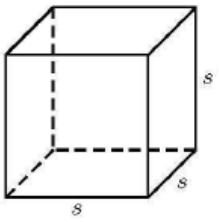
Regular Solids:

Tetrahedron – 4 faces
Cube – 6 faces
Octahedron – 8 faces
Dodecahedron – 12 faces
Icosahedron – 20 faces

3D GEOMETRY FORMULAS

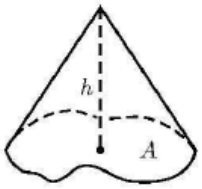
CUBE

s = side
Volume: $V = s^3$
Surface Area: $S = 6s^2$



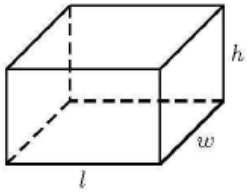
GENERAL CONE OR PYRAMID

A = area of base, h = height
Volume: $V = \frac{1}{3}Ah$



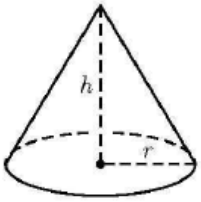
RECTANGULAR SOLID

l = length, w = width,
h = height
Volume: $V = lwh$
Surface Area:
$S = 2lw + 2lh + 2wh$



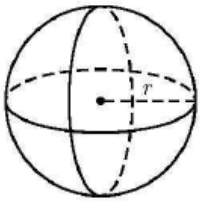
RIGHT CIRCULAR CONE

r = radius, h = height
Volume: $V = \frac{1}{3}\pi r^2 h$
Surface Area:
$S = \pi r\sqrt{r^2 + h^2} + \pi r^2$



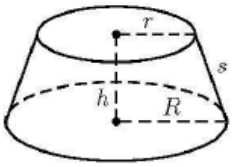
SPHERE

r = radius
Volume: $V = \frac{4}{3}\pi r^3$
Surface Area: $S = 4\pi r^2$



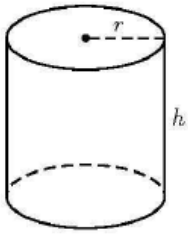
FRUSTUM OF A CONE

r = top radius, R = base radius,
h = height, s = slant height
Volume: $V = \frac{\pi}{3}(r^2 + rR + R^2)h$
Surface Area:
$S = \pi s(R + r) + \pi r^2 + \pi R^2$



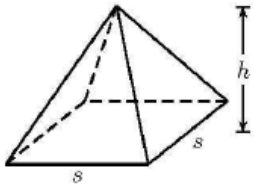
RIGHT CIRCULAR CYLINDER

r = radius, h = height
Volume: $V = \pi r^2 h$
Surface Area: $S = 2\pi rh + 2\pi r^2$



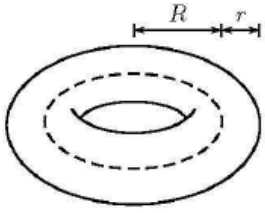
SQUARE PYRAMID

s = side, h = height
Volume: $V = \frac{1}{3}s^2 h$
Surface Area:
$S = s(s + \sqrt{s^2 + 4h^2})$



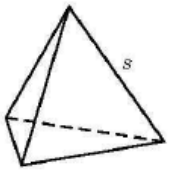
TORUS

r = tube radius,
R = torus radius
Volume: $V = 2\pi^2 r^2 R$
Surface Area: $S = 4\pi^2 rR$

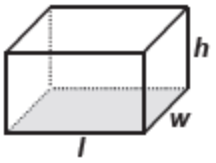
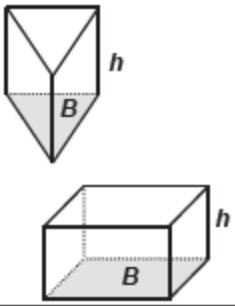
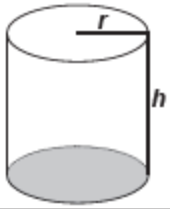
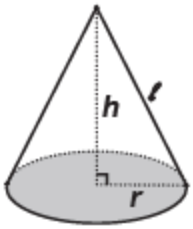
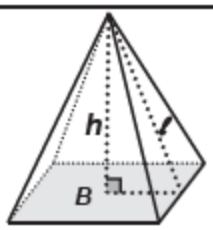


REGULAR TETRAHEDRON

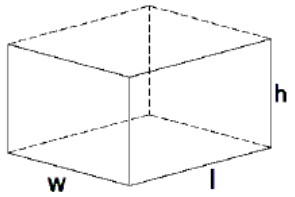
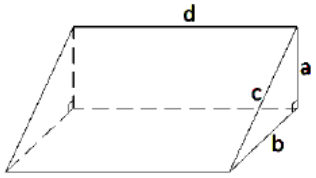
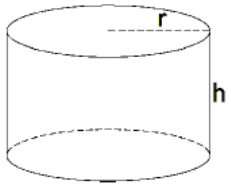
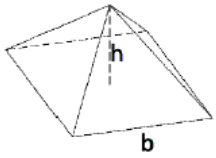
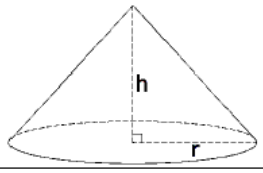
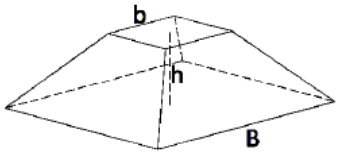
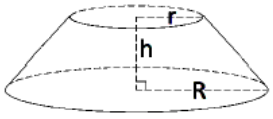
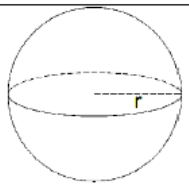
s = side
Volume: $V = \frac{1}{12}\sqrt{2}s^3$
Surface Area: $S = \sqrt{3}s^2$



Volume (*V*) and Surface Area (*SA*)

Name	Shape	Formula
Right Rectangular Prism		$v = lwh$ $SA = 2lw + 2hw + 2lh$
General Prism		$v = Bh$ SA = Sum of the areas of the faces
Right Circular Cylinder		$V = \pi r^2 h$ $SA = 2\pi r^2 + 2\pi rh$
Right Circular Cone		$v = \frac{1}{3}\pi r^2 h$ $SA = \pi r^2 + \pi rl$
Right Pyramid		$v = \frac{1}{3}Bh$ $SA = B + \frac{1}{2}Pl$
Sphere		$V = \frac{4}{3}\pi r^3$ $SA = 4\pi r^2$

Solid Figure Geometry Formulas:

Name	Figure	Surface Area (SA)	Volume (V)
Rectangular Prism		$SA = 2wl + 2hl + 2wh$	$V = lwh$
Triangular Prism		$SA = ab + d(a + b + c)$	$V = \frac{1}{2}abd$
Cylinder		$SA = 2\pi r^2 + 2\pi rh$	$V = \pi r^2 h$ $V = \frac{\pi d^2 h}{4}$ this formula can be used if the diameter (d) is known instead of the radius
Pyramid		$SA = b^2 + b\sqrt{b^2 + 4h^2}$	$V = \frac{1}{3}b^2 h$
Cone		$SA = \pi r^2 + \pi r\sqrt{r^2 + h^2}$	$V = \frac{1}{3}\pi r^2 h$
Frustum of a Pyramid		$SA = b^2 + B^2 + (B + b)\sqrt{(B - b)^2 + h^2}$	$V = \frac{1}{3}h\left(B^2 + Bb + b^2\right)$
Frustum of a Cone		$SA = \pi r^2 + \pi R^2 + \pi(R + r)\sqrt{(R - r)^2 + h^2}$	$V = \frac{1}{3}\pi h\left(R^2 + Rr + r^2\right)$
Sphere		$SA = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$

Volume Formulas

Sphere = $(4/3)\ \pi r^3$

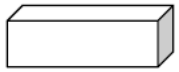
Cylinder = $\pi r^2 h$

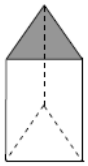
Formulas for Volume (V) and Surface Area (SA)

Right Prism

$V = Bh = \text{area of base} \times \text{height}$

$SA = 2B + Ph = 2 \times \text{area of base} + (\text{perimeter} \times \text{height})$





Right Circular Cylinder

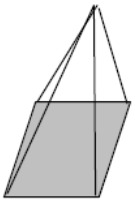
$V = Bh = \text{area of base} \times \text{height} = \pi r^2 h$

$SA = 2B + Ch = 2 \times \text{base} + (\text{circumference} \times \text{height}) = 2\pi r^2 + 2\pi rh$

Regular Pyramid

$V = \frac{1}{3}Bh = \frac{1}{3} \times \text{area of base} \times \text{height}$

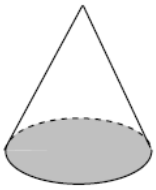
$SA = B + \frac{1}{2}Pl = \text{area of base} + \frac{1}{2} \times \text{perimeter of base} \times \text{slant height}$



Right Circular Cone

$V = \frac{1}{3}Bh = \frac{1}{3} \times \text{area of base} \times \text{height} = \frac{1}{3}\pi r^2 h$

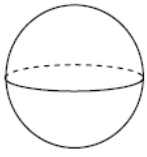
$SA = \pi r^2 + \pi rl$



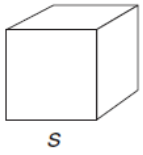
Sphere

$V = \frac{4}{3}\pi r^3$

$SA = 4\pi r^2$

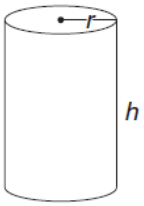


Cube



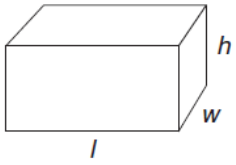
Volume = s^3
Surface Area = $6s^2$

Cylinder



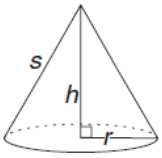
Volume = $\pi r^2 h$
Surface Area = $2\pi r^2 + 2\pi rh$
Lateral Area = $2\pi rh$

Rectangular Solid



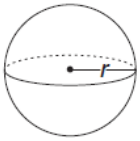
Volume = lwh
Surface Area = $2wl + 2lh + 2wh$
Lateral Area = $2(l + w)h$

Cone



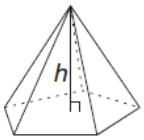
Volume = $\frac{1}{3}\pi r^2 h$
Surface Area = $\pi r^2 + \pi rs$
Lateral Area = πrs

Sphere



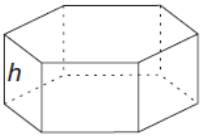
Volume = $\frac{4}{3}\pi r^3$
Surface Area = $4\pi r^2$

Right Pyramid



Volume = $\frac{1}{3}$ × base area × h
Surface Area = base area + face areas

Right Prism



Volume = base area × h
Surface Area = base areas + face areas
Lateral Area = sum of face areas