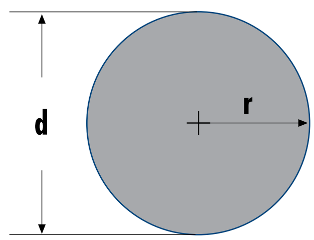
SURFACES AND VOLUMES

CIRCLE

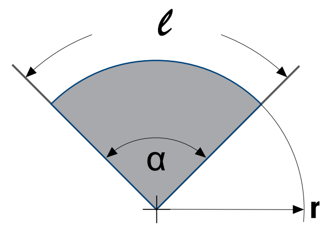


$c^{*} = 2\pi r = \pi d$

*circle

$A = \pi r^2 = \dfrac{\pi d^2}{4}$

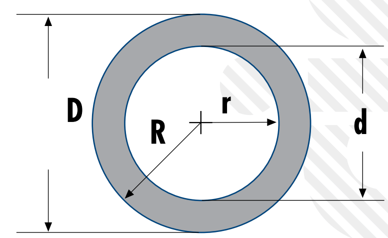
CIRCULAR SECTOR



$A = 0{,}5 \cdot r\ell$

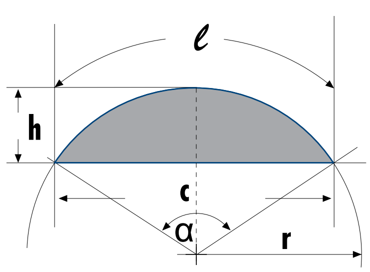
$\ell = \dfrac{\pi r \alpha}{180}$ $\quad \alpha = \dfrac{57{,}269\ell}{r}$

CIRCULAR CORONA



$A = \pi \cdot (R^2 - r^2)$

CIRCULAR SEGMENT



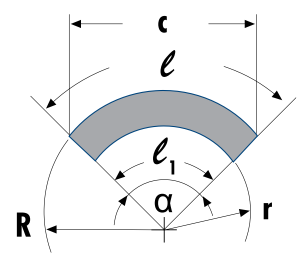
$A = 0{,}5 \cdot [r\ell - c \cdot (r - h)]$

$c = \sqrt{2\ h\,(2r - h)}$

$h = r \cdot [1 - \cos(\alpha/2)]$

$\alpha = \dfrac{57{,}296\ell}{r}$

ARC OF CIRCULAR CORONA

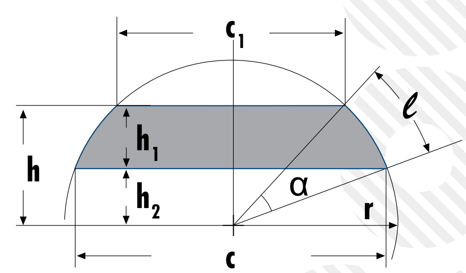


$A = \dfrac{\alpha \cdot \pi}{360} \cdot (R^2 - r^2)$

$A = 2R\mathrm{sen}\ \dfrac{\alpha}{2}$

$\alpha = \dfrac{180\ell}{\pi R}$

CIRCULAR SEGMENT WITH TWO BASES



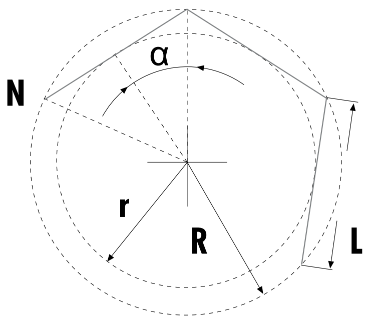
$A = r\ell \ \dfrac{(c_1 h) - (ch_2)}{2}$

$c = 2\sqrt{r - h_2 \cdot [2r - (r - h_2)]}$

$c_1 = 2\sqrt{r - h \cdot [2r - (r - h)]}$

$r = \dfrac{c^2 / 4 + (r - h_2)^2}{2\,(r - h_2)}$ $\quad \ell = \dfrac{\pi r \alpha}{180}$

AREA OF POLYGONS



$$L = 2R\sin\alpha = 2r\tan\alpha$$

$$A = \frac{N\cot\alpha L^2}{4} = N\tan\alpha\, r^2$$

$$R = \frac{R}{2\sin\alpha} = \frac{r}{\cos\alpha}$$

N = number of sides

L = length of a side

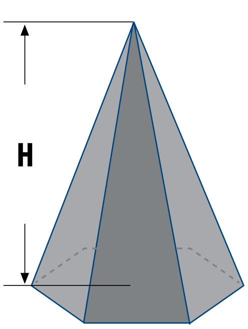
R = radius of circumscribed circle

r = radius of inscribed circle

α = 180/N

N	A =			R =		L =		r =	
	L^2 x	R^2 x	r^2 x	Lx	rx	Rx	rx	Rx	Lx
3	0,4330	1,2990	5,1962	0,5774	2,0000	1,7321	3,4641	0,5000	0,2887
4	1,0000	2,0000	4,0000	0,7071	1,4142	1,4142	2,0000	0,7071	0,5000
5	1,7205	2,3776	3,6327	0,8507	1,2361	1,1756	1,4531	0,8090	0,6882
6	2,5981	2,5981	3,4641	1,0000	1,1547	1,0000	1,1547	0,8660	0,8660
7	3,6339	2,7364	3,3710	1,1524	1,1099	0,8678	0,9631	0,9010	1,0383
8	4,8284	2,8284	3,3137	1,3066	1,0824	0,7654	0,8284	0,9239	1,2071
9	6,1818	2,8925	3,2757	1,4619	1,0642	0,6840	0,7279	0,9397	1,3737
10	7,6942	2,9389	3,2492	1,6180	1,0515	0,6180	0,6498	0,9511	1,5388
12	11,196	3,0000	3,2154	1,9319	1,0353	0,5176	0,5359	0,9659	1,8660
15	17,642	3,0505	3,1883	2,4049	1,0223	0,4158	0,4251	0,9781	2,3523
16	20,109	3,0615	3,1826	2,5629	1,0196	0,3902	0,3978	0,9808	2,5137
20	31,569	3,0902	3,1677	3,1962	1,0125	0,3129	0,3168	0,9877	3,1569
24	45,575	3,1058	3,1597	3,8306	1,0086	0,2611	0,2633	0,9914	3,7979
32	81,225	3,1214	3,1517	5,1011	1,0048	0,1960	0,1970	0,9952	5,0766
48	183,08	3,1326	3,1461	7,6449	1,0021	0,1308	0,1311	0,9979	7,6285
64	325,69	3,1365	3,1441	10,190	1,0012	0,0981	0,0983	0,9988	10,178

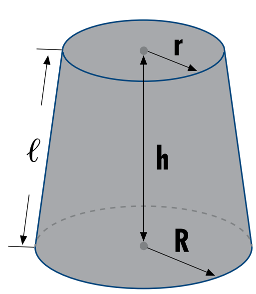
REGULAR PYRAMID (BASE N SIDES)



M = somma area di N triangoli isosceli

$$V = \frac{1}{3}\, h \cdot \text{area base}$$

TRUNCATED OF CONE AT PARALLEL BASES



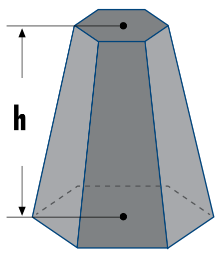
$$V = 1{,}0472\, h \cdot (R^2+Rr+r^2)$$

$$M = \pi\ell \cdot (R+r)$$

$$\ell = \sqrt{h^2+(R-r)^2}$$

SURFACES AND VOLUMES

TRUNCATED PYRAMID AT PARALLEL BASES

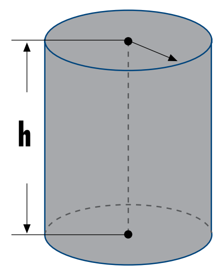


M = area sum of N trapetiums

A e B = bases area

$$V = \frac{h}{3}\left(A+B+\sqrt{AB}\right)$$

CIRCULAR RIGHT CYLINDER

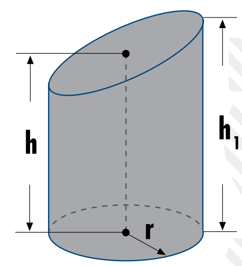


$$V = \pi r^2 h$$

$$M = 2\pi r h$$

total surface = $2\pi r\,(r + h)$

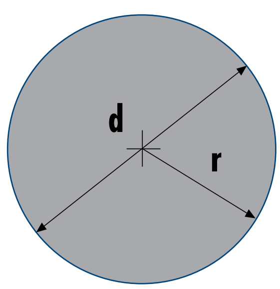
RIGHT CYLINDER WITH OBLIQUE SECTION



$$M = \pi r \cdot (h + h_1)$$

$$V = \pi r^2 \frac{h + h_1}{2}$$

SPHERE

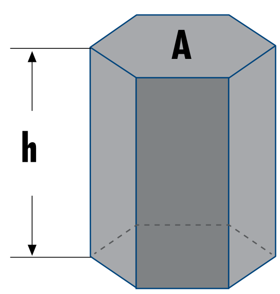


$$V = \frac{4\pi r^3}{3}$$

$$r = \sqrt[3]{\frac{3V}{4\pi}}$$

total surface = $4\pi r^2$

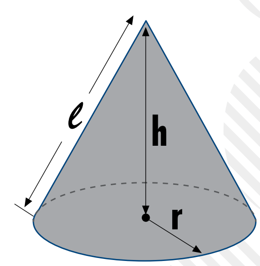
PRISM



$$V = h \cdot A$$

A = polygon area

RIGHT CONE



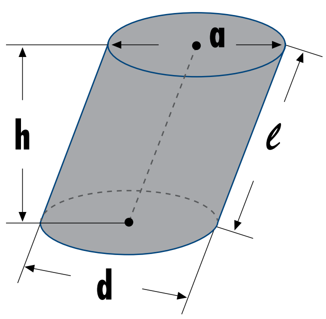
$$V = 1{,}0472 \cdot r^2 h$$

$$M = \pi r\sqrt{r^2 + h^2}\ \pi r\ell$$

$$\ell = \sqrt{r^2 + h^2}$$

SURFACES AND VOLUMES

OBLIQUE CYLINDER WITH PARALLEL BASES

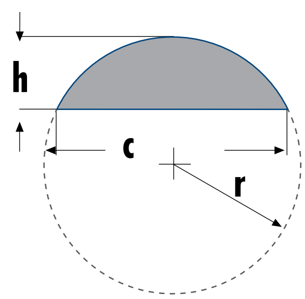


$$M = d \cdot \pi \cdot \ell$$

$$V = r^2 \cdot \ell \cdot \pi = 0{,}7854 \cdot a \cdot d \cdot h$$

total surface $= M + 2 \cdot (0{,}7854 \cdot a \cdot d)$

SPHERICAL SEGMENT

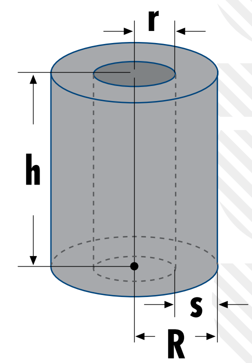


$$V = \pi h^2 \cdot (r - \frac{h}{3})$$

$$M = 2\pi r h = \pi \cdot (\frac{c^2}{4} + h^2)$$

$$c = 2\sqrt{h(2r-h)} \qquad r = \frac{c^2 + 4h^2}{8h}$$

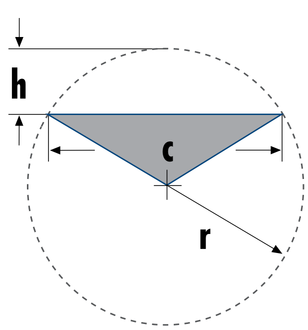
HOLLOW CYLINDER



$$V = \pi h(R^2 - r^2) = \pi h s(2r+s) = \pi h s(2R-s)$$

$$M = 2\pi h(R+r)$$

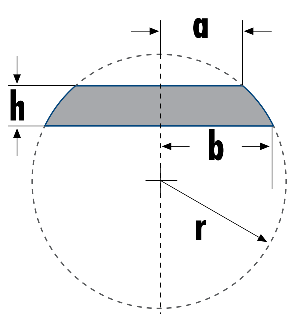
SPHERICAL SECTOR



$$V = \frac{2\pi r^2 h}{3} \qquad c = 2\sqrt{h(2r-h)}$$

total surface $= \pi r \cdot (2h + \frac{1}{2} c)$

SPHERICAL ZONE

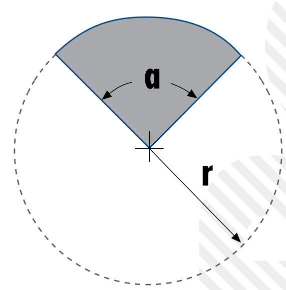


$$M = 2\pi r h$$

$$V = \frac{1}{6} \pi h \cdot (3a^2 + 3b^2 + h^2)$$

$$r = \sqrt{b^2 + (\frac{b^2 - a^2 - h^2}{2h})}$$

SPHERICAL WEDGE



$$V = \frac{\alpha}{360} \cdot \frac{4\pi r^2}{3}$$

$$M = \frac{\alpha}{360} \cdot 4\pi r^2$$