Formulario di Geometria

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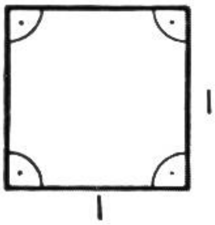
Tav. 1

Formulario di Geometria

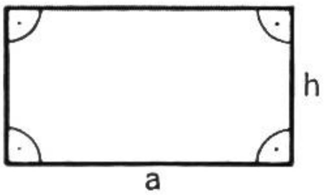


Il quadrato (lati uguali; angoli uguali)

l = lato   p = perimetro   A = area

$p = 4l \qquad l = \frac{p}{4} = p : 4$

$A = l \cdot l = l^2 \qquad l = \sqrt{A}$

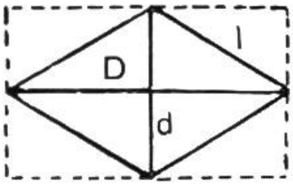


Il rettangolo (lati disuguali; angoli uguali)

a = lunghezza (base)   h = larghezza (altezza)

$p = 2\,(a + h) \qquad a = \frac{p}{2} - h \qquad h = \frac{p}{2} - a$

$A = ah \qquad a = A : h \qquad h = A : a$



l = lato   D = diagonale maggiore
d = diagonale minore

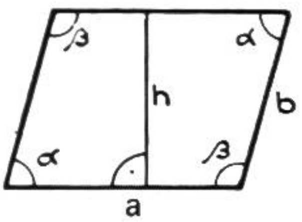
La losanga (lati uguali; angoli disuguali)

$p = 4l \qquad l = p : 4$

$A = \frac{D \cdot d}{2} \qquad D = \frac{2A}{d} \qquad d = \frac{2A}{D}$

Caso speciale del quadrato:

$A = \frac{d \cdot d}{2} = \frac{d^2}{2} \qquad d = \sqrt{2A}$



a = base   h = altezza
b = lato consecutivo alla base

Il romboide qualunque

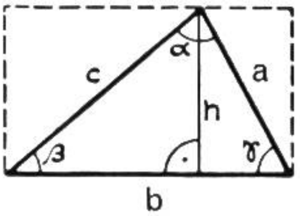
(lati ed angoli disuguali)

$\alpha + \beta = 180°$

$p = 2\,(a + b) \qquad a = \frac{p}{2} - b \qquad b = \frac{p}{2} - a$

$A = ah \qquad a = A : h \qquad h = A : a$

Osservazione: Ricordare che il segno ×, quando non sia sostitutio da · è sempre da sottintendere e che il segno ___ (fratto) vale il segno :
Per designare l'ampiezza di angoli (archi), solitamente, si ricorre a lettere dell' alfabeto greco: $\alpha, \beta, \gamma, \delta, \varepsilon, \pi, \lambda, \omega, \ldots$



b = base
h = altezza

Il triangolo

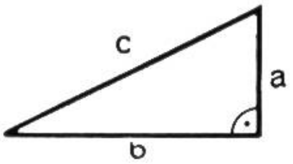
$p = a + b + c$

$a = p - (b + c)$ $\quad b = p - (a + c)$ $\quad c = p - (a + b)$

$A = \dfrac{bh}{2}$ $\quad b = \dfrac{2A}{h}$ $\quad h = \dfrac{2A}{b}$

$\alpha + \beta + \gamma = 180°$ $\quad \alpha = 180° - (\beta + \gamma)$

$\beta = 180° - (\alpha + \gamma)$ $\quad \gamma = 180° - (\alpha + \beta)$



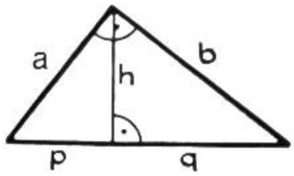
a, b = cateti
c = ipotenusa

Il teorema di Pitagora

$c^2 = a^2 + b^2$ $\quad c = \sqrt{a^2 + b^2}$

$a^2 = c^2 - b^2$ $\quad a = \sqrt{c^2 - b^2} = \sqrt{(c + b)(c - b)}$

$b^2 = c^2 - a^2$ $\quad b = \sqrt{c^2 - a^2} = \sqrt{(c + a)(c - a)}$

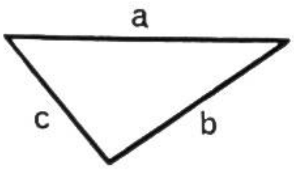


c = p + q

$a^2 = cp$ $\quad a = \sqrt{cp}$ $\quad c = a^2 : p$ $\quad p = a^2 : c$

$b^2 = cq$ $\quad b = \sqrt{cq}$ $\quad c = b^2 : q$ $\quad q = b^2 : c$

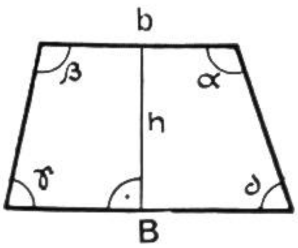
$h^2 = pq$ $\quad h = \sqrt{pq}$ $\quad p = h^2 : q$ $\quad q = h^2 : p$



Formola di Erone

a, b, c, lati del triangolo A = area

$s = \dfrac{a + b + c}{2}$ $\quad A = \sqrt{s(s - a)(s - b)(s - c)}$



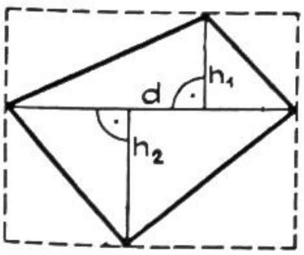
h = altezza

Il trapezio

B = base maggiore b = base minore

$A = \dfrac{B + b}{2} \cdot h$ $\quad B = \dfrac{2A}{h} - b$ $\quad b = \dfrac{2A}{h} - B$

$\alpha + \delta = \beta + \gamma = 180°$



Il trapezoide

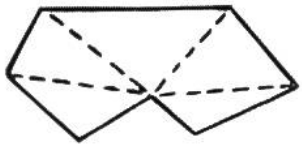
d = diagonale $\quad h_1, h_2$ = altezze

$A = \dfrac{d(h_1 + h_2)}{2}$

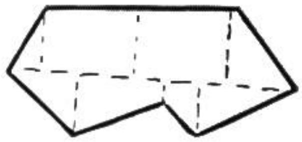
$d = \dfrac{2A}{h_1 + h_2}$ $\quad h_1 = \dfrac{2A}{d} - h_2$ $\quad h_2 = \dfrac{2A}{d} - h_1$

Tav. 3

Poligono qualunque

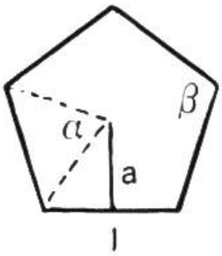


Scomposizione in triangoli



Sc. trapezi rett. e triang. rett.

Poligono regolare



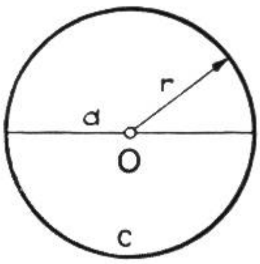
l = lato a = apotema n = numero dei lati

$p = ln \quad l = p : n \quad n = p : l$

$A = \frac{pa}{2} \qquad p = \frac{2A}{a} \qquad a = \frac{2A}{p}$

$\alpha = \frac{360°}{n} \qquad \beta = 180° - \alpha$

Il circolo



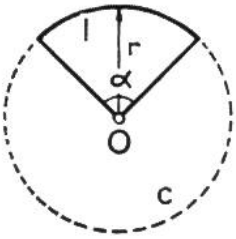
O = centro d = diametro r = raggio c = circonferenza

$d = 2r \quad r = d : 2 \quad c : d = \pi \quad c = \pi d = 2\pi r$

$d = c : \pi \qquad r = \frac{c}{2\pi} \qquad A = \pi r^2 = \frac{\pi d^2}{4} = \frac{c^2}{4\pi}$

$r = \sqrt{A : \pi} \qquad d = 2\sqrt{A : \pi} \qquad c = 2\sqrt{\pi A}$

Settore circolare

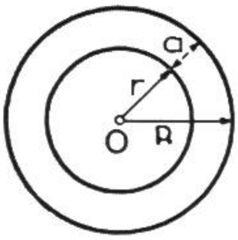


l = lunghezza arco α = ampiezza settore

$l = \frac{\alpha}{360} c = \frac{\alpha}{360} \pi d = \frac{\alpha}{180} \pi r \qquad \alpha = \frac{360 l}{c} = \frac{360 l}{\pi d} = \frac{180 l}{\pi r}$

$A = \frac{l r}{2} = \frac{\alpha}{360} \pi r^2 \qquad l = \frac{2A}{r} \qquad r = \frac{2A}{l} = 6\sqrt{\frac{10A}{\pi \alpha}}$

Corona circolare



R, r = raggi D, d = diametri

$a = R - r$ = larghezza della corona

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

$= \pi a (2r + a) = \pi a (d + a) = \pi a (2R - a) = \pi a (D - a)$

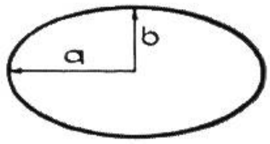
R, r = raggi

Settore di corona circolare

L, l = lunghezza archi α = ampiezza del settore

a = R — r = larghezza della corona

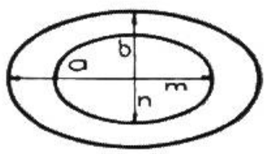
$$A = \frac{L + l}{2}\, a = \frac{\alpha}{360}\, \pi \,(R^2 - r^2) = \frac{\alpha}{360}\, \pi \,(R + r)(R - r)$$



Ellisse

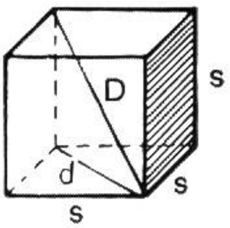
a = semiasse maggiore   b = semiasse minore

$$A = \pi a b \qquad a = \frac{A}{\pi b} \qquad b = \frac{A}{\pi a}$$



Corona elittica

a, b = semiassi ellisse maggiore
m, n = semiassi ellisse minore $A = \pi\,(a b - m n)$

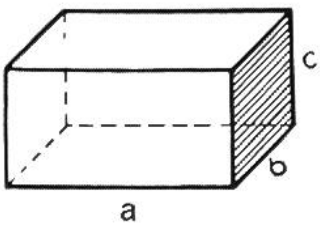


Il cubo

s = spigolo   V = volume   A = area della superficie
d = diagonale di una faccia   D = diagonale del cubo

$$d^2 = 2s^2 \qquad d = s\sqrt{2} \qquad D^2 = 3s^2 \qquad D = s\sqrt{3}$$

$$A = 6s^2 \qquad s = \sqrt{A:6} \qquad V = s^3 \qquad s = \sqrt[3]{V}$$

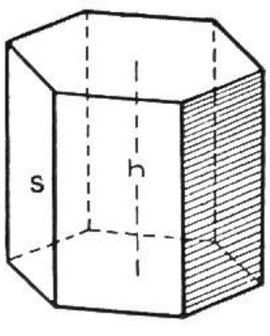


Il parallelepipedo rettangolo

a, b, c = dimensioni   a, b = lati di base   c = altezza
A_l = area laterale A_t = area totale   V = volume

$$A_l = 2\,(a+b)\,c \qquad A_t = 2c\,(a+b) + 2\,ab = 2\,(ab+ac+bc)$$

$$V = abc \qquad a = \frac{V}{bc} \qquad b = \frac{V}{ac} \qquad c = \frac{V}{ab}$$



Il prisma retto

p = perimetro di base   s = spigolo laterale   h = altezza
B = area di base A_l = area laterale A_t = area totale
V = volume

$$A_l = ps \qquad p = \frac{A_l}{s} \qquad s = \frac{A_l}{p}$$

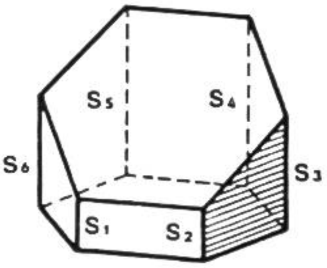
$$A_t = A_l + 2\,B \qquad B = (A_t - A_l):2$$

$$V = Bh \qquad B = V:h \qquad h = V:B$$

La formola del volume vale anche per il prisma obliquo

Tav. 5

Tronco di prisma retto

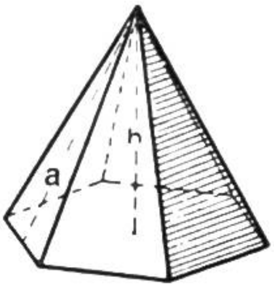


s_1, s_2... = spigoli laterali n = numero degli s B = area della base retta B' = area della base obliqua risp. agli s

$$A_l = p\,\frac{s_1 + s_2 + \dots + s_n}{n} \qquad A_t = A_l + B + B'$$

$$V = B\,\frac{s_1 + s_2 + \dots + s_n}{n}$$

La piramide retta

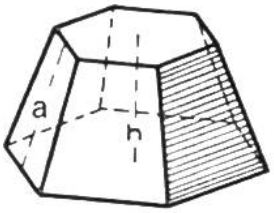


p = perimetro di base a = apotema B = area di base

$$A_l = \frac{p\,a}{2} \qquad p = \frac{2\,A_l}{a} \qquad a = \frac{2\,A_l}{p} \qquad A_t = A_l + B$$

$$V = \frac{B\,h}{3} \qquad B = \frac{3\,V}{h} \qquad h = \frac{3\,V}{B}$$

Tronco di piramide retta

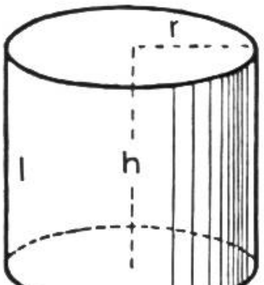


P, p = perimetri di base B, b = area delle basi a = apot.

$$A_l = \frac{P + p}{2}\,a \qquad a = \frac{2\,A_l}{P + p} \qquad P = \frac{2\,A_l}{a} - p \qquad p = \frac{2\,A_l}{a} - P$$

$$V = \frac{1}{3}\,h\,(B + b + \sqrt{Bb})$$

Il cilindro retto



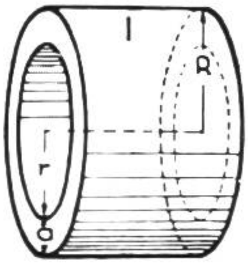
r = raggio di base h = altezza l = lato

$$A_l = 2\,\pi\,r\,l \qquad l = \frac{A_l}{2\,\pi\,r} \qquad r = \frac{A_l}{2\,\pi\,l} \qquad A_t = 2\,\pi\,r\,l + 2\,\pi\,r^2 = 2\,\pi\,r\,(l + r)$$

$$V = \pi\,r^2\,h \qquad h = \frac{V}{\pi\,r^2} \qquad r = \sqrt{\frac{V}{\pi\,h}}$$

La formula del volume vale anche per il cilindro obliquo

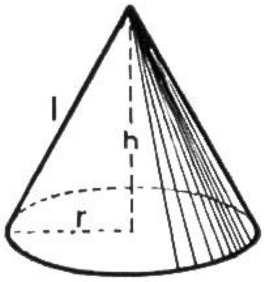
Involucro cilindrico (tubo)



D, d = diametri R, r = raggi l = lunghezza

$$V = \pi\,(R^2 - r^2)\,l = \pi\,l\,(R + r)\,(R - r) =$$

$$\frac{\pi}{4}\,(D^2 - d^2)\,l = \frac{\pi}{4}\,(D + d)\,(D - d)$$

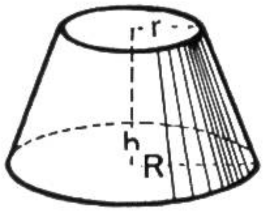


Il cono retto

r = raggio di base h = altezza l = lato o apotema

$A_l = \pi r l \quad l = \frac{A_l}{\pi r} \quad r = \frac{A_l}{\pi l} \quad A_t = \pi r l + \pi r^2 = \pi r (l + r)$

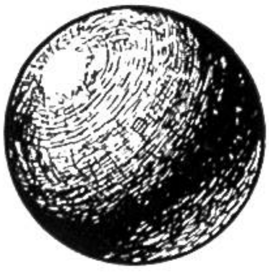
$V = \frac{1}{3} \pi r^2 h \quad h = \frac{3V}{\pi r^2} \quad r = \sqrt{\frac{3V}{\pi h}}$



Tronco di cono retto

$A_l = \pi (R + r) l \quad l = \frac{A_l}{\pi (R + r)} \quad R = \frac{A_l}{\pi l} - r$

$r = \frac{A_l}{\pi l} - R \quad V = \frac{1}{3} \pi h (R^2 + r^2 + R r)$



La sfera

r = raggio d = diametro c = circonferenza massima

$A = 4\pi r^2 = \pi d^2 = \frac{c^2}{\pi} \quad r = \sqrt{\frac{A}{4\pi}} \quad d = \sqrt{\frac{A}{\pi}} \quad c = \sqrt{\pi A}$

$V = \frac{4}{3} \pi r^3 = \frac{\pi}{6} d^3 \quad r = \sqrt[3]{\frac{3V}{4\pi}} \quad d = \sqrt[3]{\frac{6V}{\pi}}$

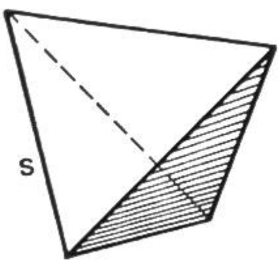
Involucro sferico

R, r = raggi delle 2 sfere D, d = diametri

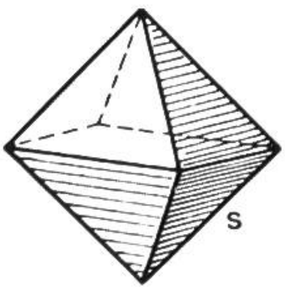
$V = \frac{4}{3} \pi (R^3 - r^3) = \frac{\pi}{6} (D^3 - d^3)$

Poliedri regolari (cubo vedi altrove)

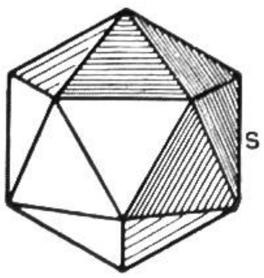
s = spigolo A = area della superficie V = volume



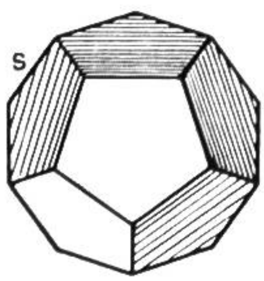
tetraedro
$A = s^2 \cdot 1{,}732$
$V = s^3 \cdot 0{,}1178$



ottaedro
$A = s^2 \cdot 3{,}4141$
$V = s^3 \cdot 0{,}4714$



icosaedro
$A = s^2 \cdot 8{,}6602$
$V = s^3 \cdot 2{,}1816$



dodecaedro
$A = s^2 \cdot 20{,}6457$
$V = s^3 \cdot 7{,}6631$