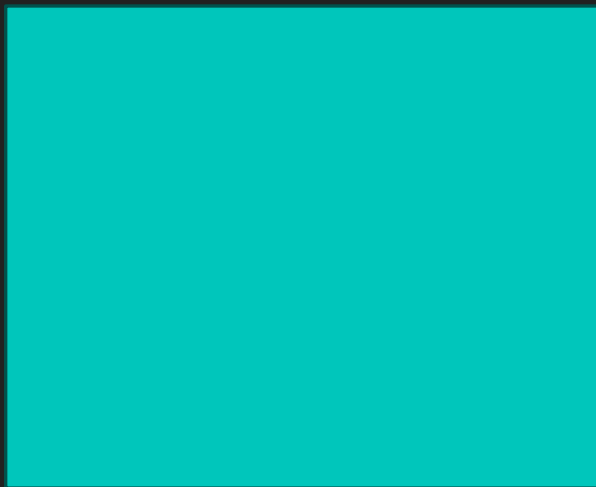


Térgeometria - elmélet

Síkidomok kerülete

- A kerület , mint matematikai fogalom, a síkidom határoló vonalának a teljes hosszát jelenti. A kerület meghatározásához össze kell adni az összes oldal hosszát.
- Jele: K
- Mértékegysége: m, dm, cm, ...



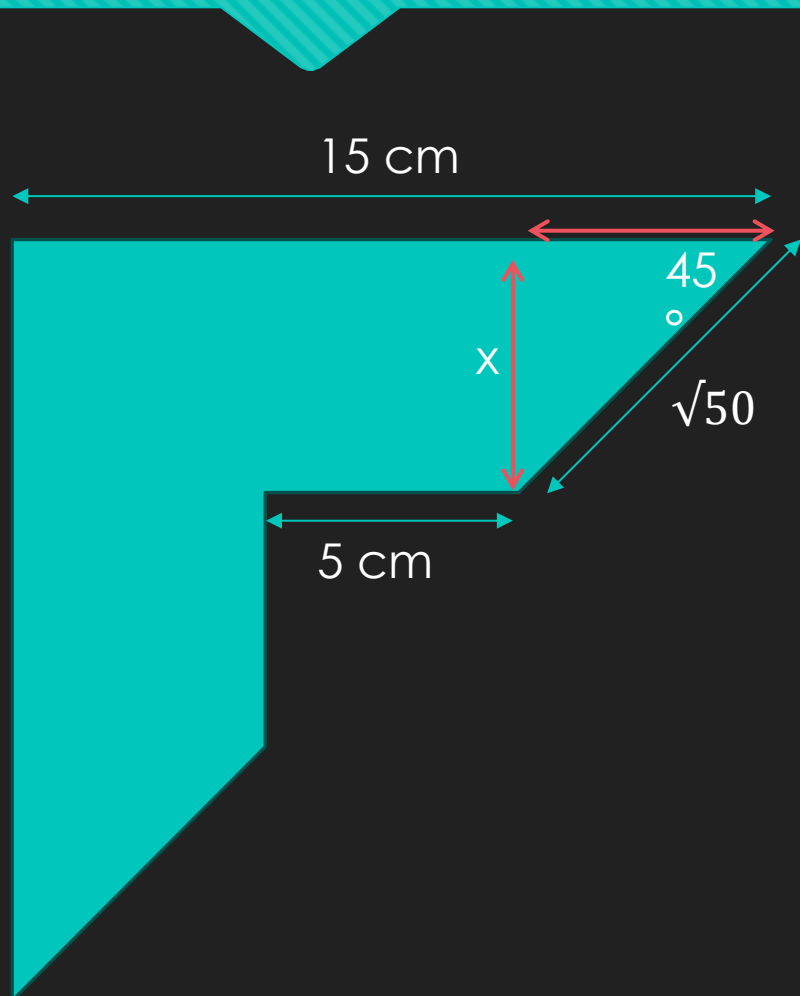
8 cm

5 cm

$$K = 5 + 5 + 8 + 8 = 26 \text{ cm}$$

Feladat:

Mennyi a szimmetrikus síkidom kerülete?



Piros nyilak: 45° miatt ez egy egyenlő szárú háromszög, azaz $x^2+x^2 = (\sqrt{50})^2$
Ebből: $x = 5$

$$K = 15 + \sqrt{50} + 5 + 5 + \sqrt{50} + 15 = 40 + 2\sqrt{50} \approx 54,14$$

Síkidomok területe

- Azt mutatja meg, hogy egy síkidom mekkora helyet foglal el a síkon. Ezt egységnégyzetekkel, vagy szétdarabolással tudjuk megoldani.
- Jele: T
- Mértékegysége: m^2 , dm^2 , cm^2 , ...

Szokványos alakzatok területe:

Négyzet: a^2

Téglalap: $a \cdot b$

Háromszög: $\frac{a \cdot m}{2}$

Paralelogramma: $a \cdot m$

Trapéz: $\frac{(a+c) \cdot m}{2}$

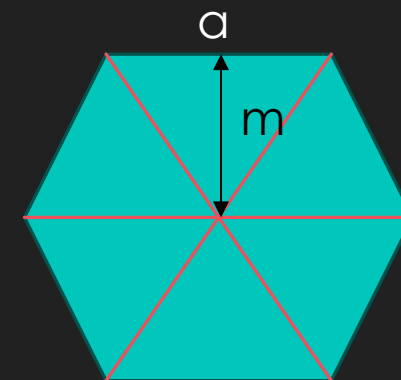
Szabályos alakzatok területe
(felbonthatóak háromszögekre):

Háromszög: $\frac{a \cdot m}{2}$

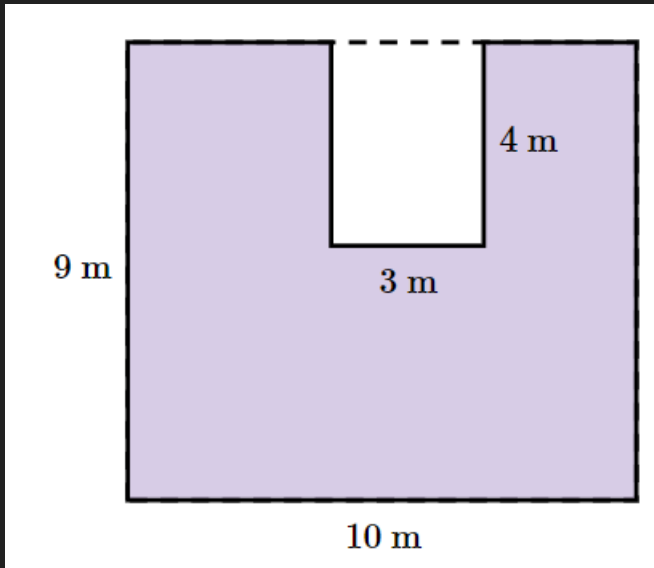
Négyzet: $2 \cdot \frac{a \cdot a}{2}$

Ötszög: $5 \cdot \frac{a \cdot m}{2}$

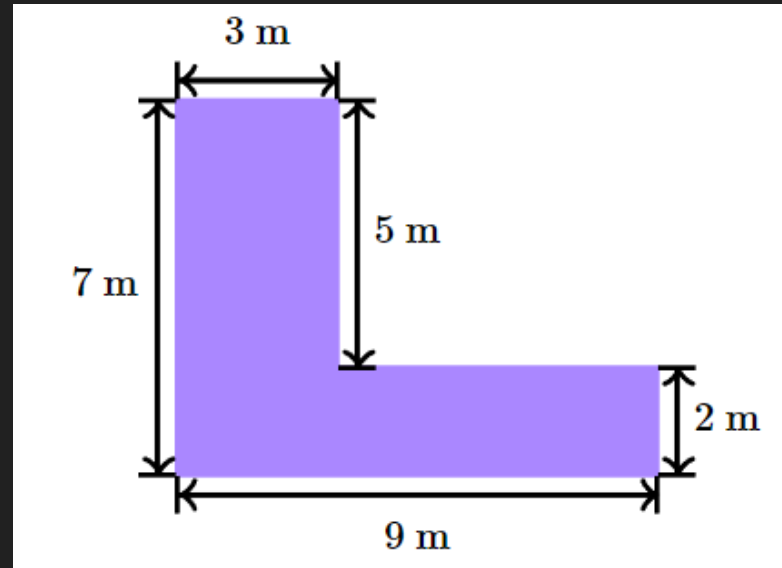
Stb.



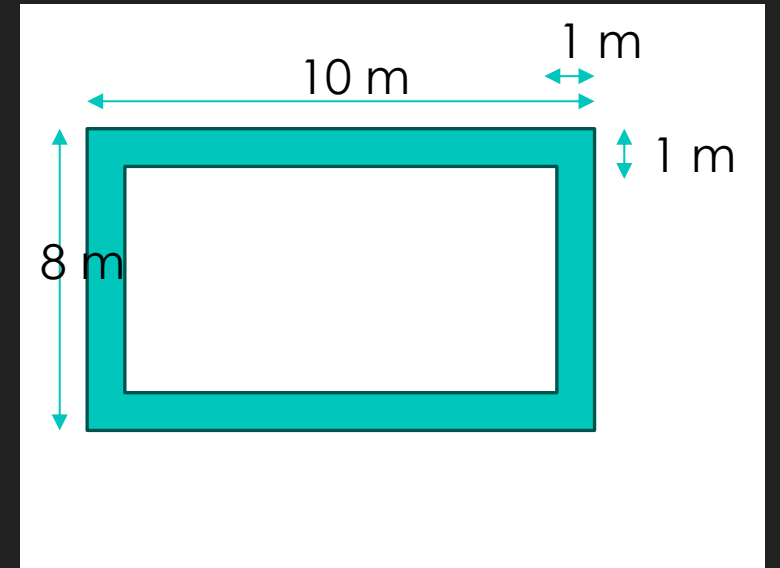
Feladat: mekkora az alakzat területe



$$T = 10 * 9 - 3 * 4 = 78 \text{ m}$$



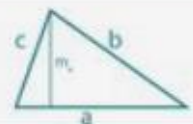

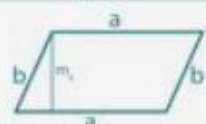
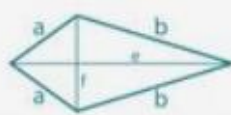
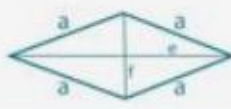

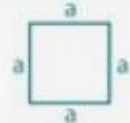

$$T = 3 * 5 + 2 * 9 = 33 \text{ m}$$



$$T = 10 * 8 - 8 * 6 = 52 \text{ m}$$

Síkidomok területe

SI PREFIX	SI SYMBOL	SI UNIT CONVERSION FACTOR (STANDARD FORM)	FACTOR (POWER)
yotta	Y	1 yottametre = 1 000 000 000 000 000 000 000 000 metres	10^{24}
zetta	Z	1 zettametre = 1 000 000 000 000 000 000 000 metres	10^{21}
exa	E	1 exametre = 1 000 000 000 000 000 000 metres	10^{18}
peta	P	1 petametre = 1 000 000 000 000 000 metres	10^{15}
tera	T	1 terametre = 1 000 000 000 000 metres	10^{12}
giga	G	1 gigametre = 1 000 000 000 metres	10^9
mega	M	1 megametre = 1 000 000 metres	10^6
kilo	k	1 kilometre = 1 000 metres	10^3
hecto	h	1 hectometre = 100 metres	10^2
deca	da	1 decametre = 10 metres	10^1
		1 metre = 1 metre	10^0
deci	d	1 decimetre = 0.1 metres	10^{-1}
centi	c	1 centimetre = 0.01 metres	10^{-2}
milli	m	1 millimetre = 0.001 metres	10^{-3}
micro	μ	1 micrometre = 0.000 001 metres	10^{-6}
nano	n	1 nanometre = 0.000 000 001 metres	10^{-9}
pico	p	1 picometre = 0.000 000 000 001 metres	10^{-12}
femto	f	1 femtometre = 0.000 000 000 000 001 metres	10^{-15}
atto	a	1 attometre = 0.000 000 000 000 000 001 metres	10^{-18}
zepto	z	1 zeptometre = 0.000 000 000 000 000 000 001 metres	10^{-21}
yocto	y	1 yocatometre = 0.000 000 000 000 000 000 000 001 metres	10^{-24}

Háromszög		$T = \frac{a \cdot m_a}{2} = \frac{b \cdot m_b}{2} = \frac{c \cdot m_c}{2}$
Trapéz		$T = \frac{a+c}{2} \cdot m$
Paralelogramma		$T = a \cdot m_a = b \cdot m_b$
Deltoid		$T = \frac{e \cdot f}{2}$
Rombusz		$T = \frac{e \cdot f}{2} = a \cdot m$
Téglalap		$T = a \cdot b$
Négyzet		$T = a^2$
Kör		$T = r^2 \cdot \pi$

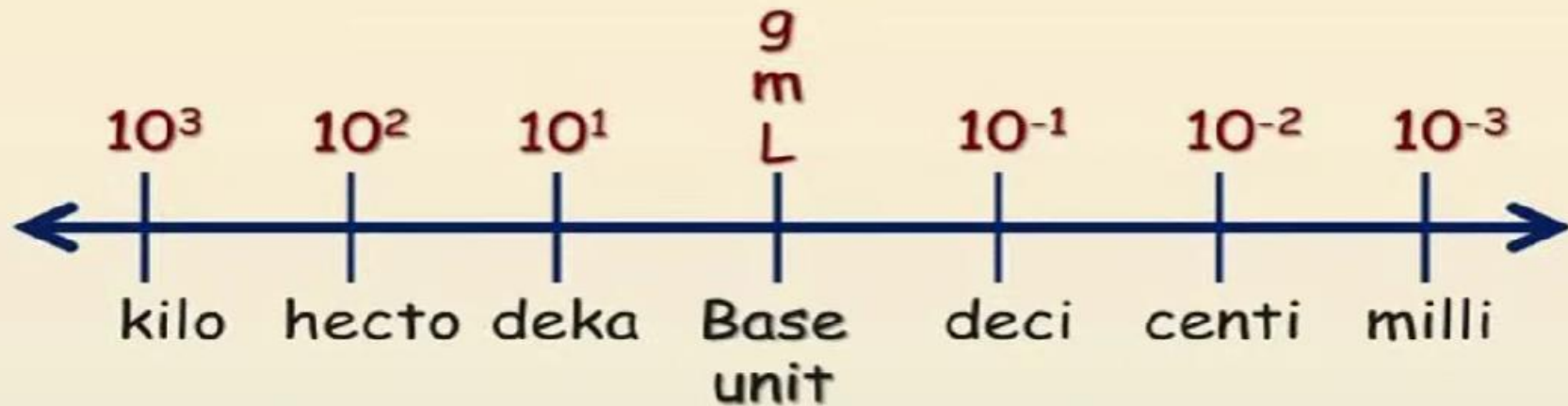
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a, b, c, d : oldalak / e, f : átlók / m, m_a, m_b, m_c : magasság / r : sugár



Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousands
	$\times 10$ →	$\times 10$ →	$\times 10$ →	$\times 10$ →	$\times 10$ →	$\times 10$ →
Kilo metre	hecto metre	deca metre	metre	deci metre	centi metre	milli metre
Kilo gram	hecto gram	deca gram	gram	deci gram	centi gram	milli gram
Kilo litre	hecto litre	deca litre	litre	deci litre	centi litre	milli litre
	$\div 10$ ←	$\div 10$ ←	$\div 10$ ←	$\div 10$ ←	$\div 10$ ←	$\div 10$ ←

Metric Conversions



Mértékváltó Társasjáték

FÉLÚT

800 m = ___ dm
6 m = ___ dm
5 l = ___ ml
20 m = ___ cm

30 cm = ___ mm

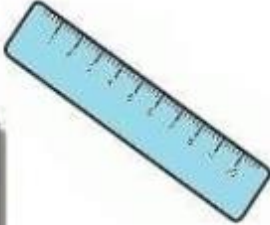


2 kg = ___ g
5 m = ___ cm
600 ml = ___ dl
520 dm = ___ m
8 dm = ___ cm
3 l = ___ cl

3 hl = ___ dl



20 cm = ___ dm
7 l = ___ ml
2 m = ___ mm



3 t = ___ kg
72 dm = ___ m
15 l = ___ dl
3 km = ___ m
6 kg = ___ dkg



600 ml = ___ l
82 m = ___ cm
8 dl = ___ cl
4 hl = ___ dl



600 l = ___ hl

START
/ CÉL

800 g = ___ dkg
3 hl = ___ l
80 cm = ___ dm
81 km = ___ m
5400 m = ___ km
200 l = ___ dl
5 dm = ___ cm
7 kg = ___ dkg
500 ml = ___ l
4 m = ___ mm

Térfogat (űrtartalom) Mértékegység átváltások

Matematikai mértékegységek

Megnevezés	Jele	Váltószámok
litér	l	1 l = 10 dl = 100 cl = 1000 ml
deciliter	dl	1 dl = 10 cl = 100 ml
centiliter	cl	1 cl = 10 ml
milliliter	ml	10 ml = 1 cl = 0,1 dl = 0,01 l
kilogramm	kg	1 kg = 100 dkg = 1000 g
dekagramm	dkg	1 dkg = 10 g
gramm	g	1000 g = 1 kg
milliméter	mm	1 méter = 10 dm = 100 cm = 1000 mm
centiméter	cm	1 cm = 10 mm
deciméter	dm	1 dm = 10 cm = 100 mm

Mértékegységek

Tömeg:

$$1 \text{ g} < 1 \text{ dkg} < 1 \text{ kg} < 1 \text{ q} < 1 \text{ t}$$

$$\times 10 \quad \times 100 \quad \times 100 \quad \times 10$$



Hosszúság:

$$1 \text{ mm} < 1 \text{ cm} < 1 \text{ dm} < 1 \text{ m} < 1 \text{ km}$$

$$\times 10 \quad \times 10 \quad \times 10 \quad \times 1000$$



Terület:

$$1 \text{ mm}^2 < 1 \text{ cm}^2 < 1 \text{ dm}^2 < 1 \text{ m}^2 < 1 \text{ ha} < 1 \text{ km}^2$$

$$\times 100 \quad \times 100 \quad \times 100 \quad \times 10\,000 \quad \times 100$$



Térfogat:

$$1 \text{ mm}^3 < 1 \text{ cm}^3 < 1 \text{ dm}^3 < 1 \text{ m}^3$$

$$\times 1000 \quad \times 1000 \quad \times 1000$$



Idő:

$$1 \text{ sec} < 1 \text{ min} < 1 \text{ h}$$

$$\times 60 \quad \times 60$$



Űrmérték:

$$1 \text{ ml} < 1 \text{ cl} < 1 \text{ dl} < 1 \text{ l} < 1 \text{ hl}$$

$$\times 10 \quad \times 10 \quad \times 10 \quad \times 100$$



MÉRTÉKEGYSÉGEINK

hosszúság jele: l **Hosszúság**
kerület jele: K
1 mm < 1 cm < 1 dm < 1 m < 1 km
10 10 10 1000
1 m = 1 000 mm 1 m = 100 cm 1 m = 10 dm 1 km = 1 000 m

terület jele: T **Terület**
felszín jele: A
1 mm² < 1 cm² < 1 dm² < 1 m² < 1 a < 1 ha < 1 km²
100 100 100 100 100 100
1 m² = 1 000 000 mm² 1 m² = 10 000 cm² 1 m² = 100 dm²

térfogat jele: V **Térfogat**
1 mm³ < 1 cm³ < 1 dm³ < 1 m³
1000 1000 1000
1 m³ = 1 000 000 cm³ 1 m³ = 1 000 dm³

űrtartalom
1 ml < 1 cl < 1 dl < 1 l < 1 hl
10 10 10 100
1 l = 1 000 ml 1 l = 100 cl 1 l = 10 dl 1 hl = 100 l

űrtartalom és térfogategységek közötti összefüggések
1 dm³ = 1 l
1 m³ = 1000 l 1 m³ = 10 hl 1 cm³ = 1 ml

tömeg jele: m **Tömeg**
1 mg < 1 g < 1 kg < 1 t
1000 1000 1000
1 kg = 1 000 000 mg 1 kg = 1 000 g 1 t = 1 000 kg


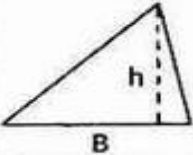
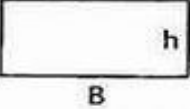
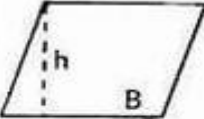
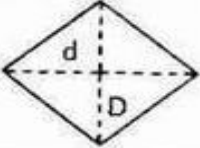
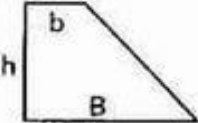
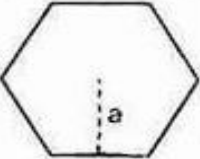
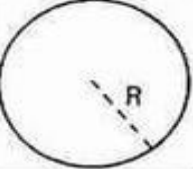
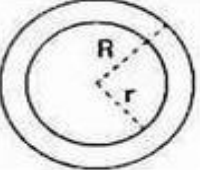
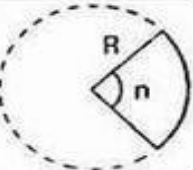
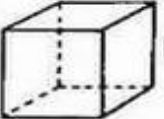
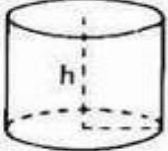
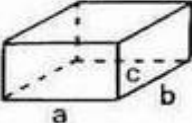
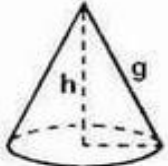
sűrűség jele: d **Sűrűség**
1 kg/m³ < 1 g/cm³

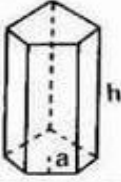
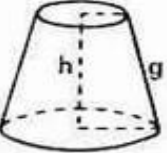
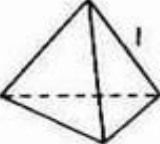
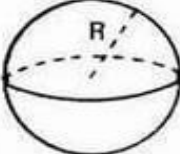
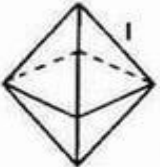

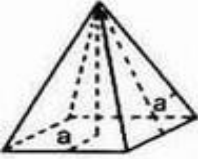
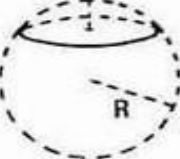
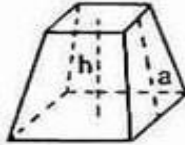
idő jele: t **Idő**
1 s(mp) < 1 min(perc) < 1 h(óra)
60 60
1 perc = 60 mp 1 óra = 3 600 mp 1 nap = 24 óra 1 év = 365 nap

SI-előtagok
kilo — ezerszeres deci — tized rész
hekto — százszoros centi — század rész
deka — tízszeres milli — ezred rész

SYNOPSIS
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Fax: (06-1) 475-2020
E-mail: info@synopsis.hu

Alakzatok térfogata

	Cuadrado $A = l^2$	Triângulo $A = \frac{1}{2} \cdot B \cdot h$	
	Rectângulo $A = B \cdot h$	Romboide $A = B \cdot h$	
	Rombo $A = \frac{1}{2} D \cdot d$	Trapezio $A = \frac{B + b}{2} \cdot h$	
	Polígono regular $A = \frac{P \cdot a}{2}$	Circulo $A = \pi R^2$ $L = 2\pi R$	
	Corona circular $A = \pi (R^2 - r^2)$	Sector circular $A = \frac{\pi R^2}{360} n$	
	Cubo $A = 6 l^2$ $V = l^3$	Cilindro $A = 2\pi R (h + R)$ $V = \pi R^2 \cdot h$	
	Ortoedro $A = 2(ab + ac + bc)$ $V = abc$	Cono $A = \pi R \cdot (g + R)$ $V = \frac{1}{3} \pi R^2 \cdot h$	

	Prisma recto $A = P(h + a)$ $V = A_b \cdot h$	Tronco de cono $A = \pi [g(R + r) + R^2 + r^2]$ $V = \frac{1}{3} \pi h (R^2 + r^2 + Rr)$	
	Tetraedro regular $A = l^2 \sqrt{3}$ $V = \frac{l^3 \cdot \sqrt{2}}{12}$	Esfera $A = 4\pi R^2$ $V = \frac{4}{3} \pi R^3$	
	Octaedro regular $A = 2 l^2 \sqrt{3}$ $V = \frac{l^3 \cdot \sqrt{2}}{3}$	Huso - Cuña esférica $A = \frac{4\pi R^2}{360} \cdot n$ $V = \frac{4}{3} \cdot \frac{\pi R^3}{360} \cdot n$	
	Pirámide recta $A = \frac{1}{2} P \cdot (a + a')$ $V = \frac{1}{3} A_b \cdot h$	Casquete esférico $A = 2\pi R \cdot h$ $V = \frac{1}{3} \pi h^2 \cdot (3R - h)$	
	Tronco de pirámide $A = \frac{1}{2} (P + P') \cdot a + A_b + A_b'$ $V = \frac{1}{3} h (A_b + A_b' + \sqrt{A_b A_b'})$	Zona esférica $A = 2\pi R \cdot h$ $V = \frac{\pi h}{6} (h^2 + 3r^2 + 3R^2)$	