FORMULE UTILE PENTRU ELEVII CLASELOR V-VIII

FORMULE DE CALCUL PRESCURTAT

$(a+b)^2=a^2+2ab+b^2$;

$(a-b)^2=a^2-2ab+b^2$;

$a^2-b^2=(a+b)(a-b)$;

$(a+b+c)^2=a^2+b^2+c^2+2ab+2ac+2bc$;

$(a+b)^3=a^3+3a^2b+3ab^2+b^3$;

$(a-b)^3=a^3-3a^2b+3ab^2-b^3$;

$a^3+b^3=(a+b)(a^2-ab+b^2)$;

$a^3-b^3=(a-b)(a^2+ab+b^2)$;

PROPRIETATILE PUTERILOR

$a^n \cdot a^m=a^{n+m}$;

$a^n:a^m=a^{n-m}$;

$(a^n)^m=a^{n \cdot m}$;

$(a \cdot b)^n=a^n \cdot b^n$;

$(a:b)^n=a^n:b^n$;

$a^0=1$;

$0^n=0$;

$1^n=1$

PROPRIETATILE RADICALILOR

$\sqrt{a \cdot b}=\sqrt{a} \cdot \sqrt{b}$; $\sqrt{a/b}=\sqrt{a}/\sqrt{b}$; $\sqrt{x^2}=|x|$; $(\sqrt{y})^2=y$; a≥0 ; b≥0 ; y≥0 ;

Exemple: $\sqrt{18}=\sqrt{9 \cdot 2}=\sqrt{9} \cdot \sqrt{2}=3\sqrt{2}$; $5\sqrt{3}=\sqrt{25} \cdot \sqrt{3}=\sqrt{25 \cdot 3}=\sqrt{75}$; $\sqrt{(-3)^2}=|-3|=3$; $(\sqrt{6})^2=6$.

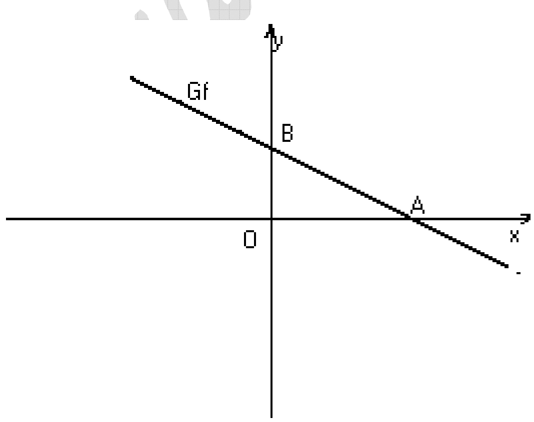
MODULUL

Definitie : |X|=X daca X≥0 si |X|= -X daca X≤0 ;

Proprietati : |X|≥0 ; |a·b|=|a|·|b| ; |a+b|≤|a|+|b| ;

Exemple : |-5|= -(-5)=5 ; |7|=7 ; |-2|= -(-2)=2 ; |+4|=4 ;

FUNCTIA LINIARA f :R→R , f(x)=ax+b



$P(x,y) \in G_f$ daca si numai daca f(x)=y ;

$A(x,y) \in G_f \cap ox$ daca f(x)=y si y=0 ;

$B(x,y) \in G_f \cap oy$ daca f(x)=y si x=0 ;

Daca f si g sunt doua functii atunci $Q(x,y) \in G_f \cap G_g$ daca f(x)=g(x)=y ;

A(-b/a , 0) si B(0 , b)

MULTIMI DE NUMERE

Multimea numerelor naturale notata cu **N** ={ 0,1,2,3,4,...∞}

Multimea numerelor intregi notata cu **Z** ={ -∞ ... ,-4,-3,-2,-1,0,1,2,3,4,...+∞}

Multimea numerelor rationale notata cu **Q**: exemple -3/4 ;5/2 ;-12/4 ;0,23 ;-5,(24) ;4,20(576) ;

Multimea numerelor reale notata cu **R** ; exemple : -3/4 ;5/2 ;-1/4 ; $7\sqrt{5}$; $-\sqrt{6}$; -5,(24) ; 4,20(576) ; 0,202002000200... ;-5,2323323332333323... ;

Orice numar natural este numar intreg : $\mathbf{N}\subset\mathbf{Z}$.

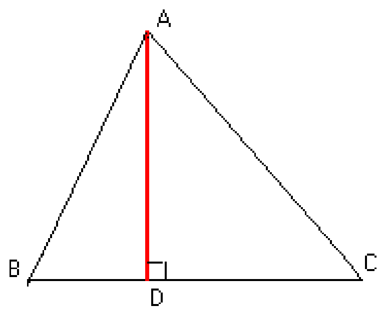
Orice numar intreg este numar rational : $\mathbf{Z}\subset\mathbf{Q}$.

Orice numar rational este numar real : $\mathbf{Q}\subset\mathbf{R}$.

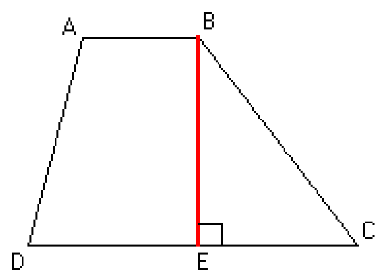
Avem urmatoarele relatii de incluziune intre aceste multimi : $\mathbf{N}\subset\mathbf{Z}\subset\mathbf{Q}\subset\mathbf{R}$.

Numerele reale care nu sunt numere rationale se numesc numere irationale.

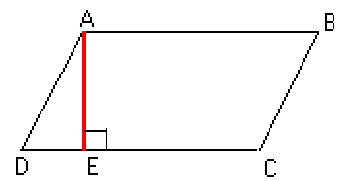
FIGURI PLANE REMARCABILE



TRIUNGHIUL OARECARE



TRAPEZUL



PARALELOGRAMUL

$A_{\Delta ABC}=\dfrac{BC\cdot AD}{2}=\dfrac{AB\cdot AC\cdot \sin A}{2}$

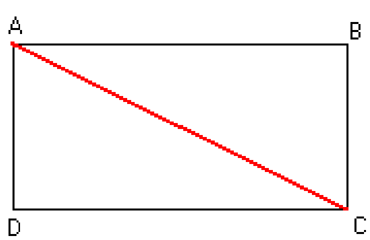
$P_{\Delta ABC}=$ AB+BC+CA

$A_{ABCD}=\dfrac{(AB+CD)\cdot BE}{2}$

$P_{ABCD}=$ AB+BC+CD+DA

$A_{ABCD}=$ CD·AE

$P_{ABCD}=$ 2·(AB+BC)

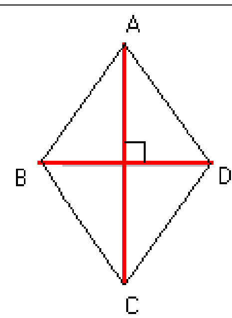


DREPTUNGHIUL

$A_{ABCD}=$ AB·BC

$AC^2=AB^2+BC^2$

$P_{ABCD}=$ 2·(AB+BC)

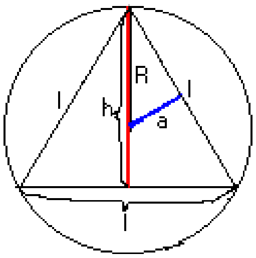


ROMBUL

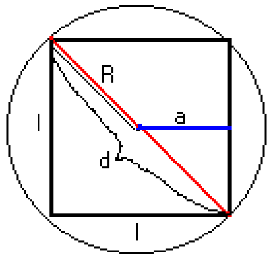
$A_{ABCD}=\dfrac{AC\cdot BD}{2}$

$P_{ABCD}=$ 4·AB

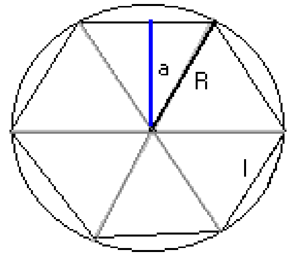
POLIGOANE REGULATE : l=latura poligonului ; a=apotema poligonului ; A=aria ; P=perimetrul ;



triunghiul echilateral



patratul



hexagonul regulat

P=3·l

P=4·l

P=6·l

$A = \frac{l^2\sqrt{3}}{4}$; $a = \frac{l\sqrt{3}}{6}$

$A = l^2$; $a = \frac{l}{2}$

$A = \frac{3l^2\sqrt{3}}{2}$; $a = \frac{l\sqrt{3}}{2}$

l=R$\sqrt{3}$

l=R$\sqrt{2}$

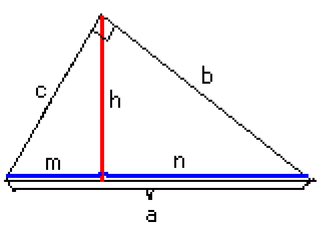
l=R

$h = \frac{l\sqrt{3}}{2} = \frac{3R}{2}$

d=l$\sqrt{2}$ =2R

TRIUNGHIUL DREPTUNGHIC

Teorema catetei: $b^2=a\cdot n$; $c^2=a\cdot m$



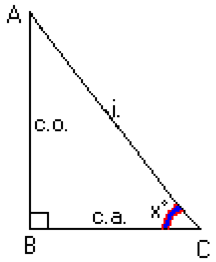
triunghiul dreptunghic

Teorema inaltimii: $h^2=m\cdot n$; $h = \frac{b\cdot c}{a}$

Teorema lui Pitagora: $a^2=b^2+c^2$; $c^2=h^2+m^2$ si $b^2=h^2+n^2$

Aria tr. dreptunghic: $A = \frac{b\cdot c}{2} = \frac{a\cdot h}{2}$

FUNCTII TRIGONOMETRICE



tr. dreptunghic

functia	30°	60°	45°	functia	30°	60°	45°
sin	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	tg	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	1
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	ctg	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	1

sin x°= $\frac{c.o.}{i.}=\frac{AB}{AC}$ cos x°= $\frac{c.a.}{i.}=\frac{BC}{AC}$ tg x°= $\frac{c.o.}{c.a.}=\frac{AB}{BC}$ ctg x°= $\frac{c.a.}{c.o.}=\frac{BC}{AB}$

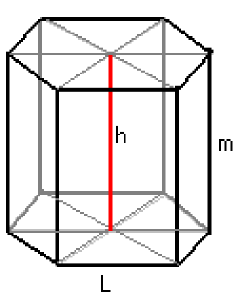
NOTATII UTILIZATE IN GEOMETRIA CORPURILOR REGULATE

A_l –aria laterala ; A_t –aria totala ; V- volumul ; a_p-apotema piramidei ; a_{tr}-apotema trunchiului

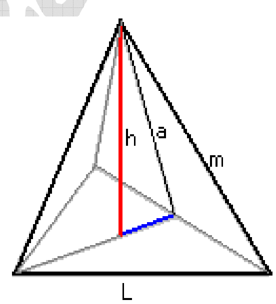
A_b-aria bazei mici ; A_B-aria bazei mari ; P_b-perimetrul bazei mici ; P_B-perimetrul bazei mari ;

h-inaltimea corpului ; m-muchia laterala ; a_b-apotema bazei mici ; a_B-apotema bazei mari ; l-latura bazei mici ; L-latura bazei mari ; g-generatoarea (la cilindru ,con ,trunchi de con) ; r-raza bazei mici ; R-raza bazei mari (sau raza sferei).

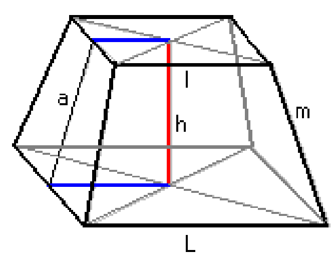
PRISMA , PIRAMIDA , TRUNCHIUL DE PIRAMIDA



PRISMA



PIRAMIDA

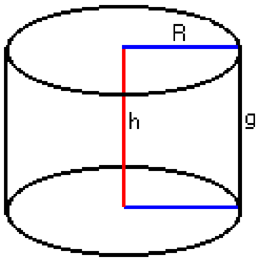


TRUNCHIUL DE PIRAMIDA

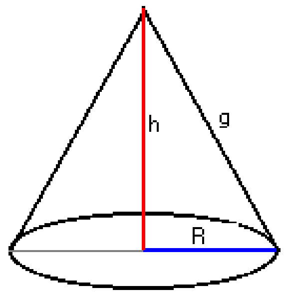
PRISMA	PIRAMIDA	TRUNCHIUL DE PIRAMIDA
$A_l=P_B \cdot m$	$A_l=\frac{P_B \cdot a_p}{2}$	$A_l=\frac{(P_b+P_B)\cdot a_{tr}}{2}$
$A_t=A_l+2\cdot A_B$	$A_t=A_l+A_B$	$A_t=A_l+A_b+A_B$
$V=A_B \cdot h$	$V=\frac{A_B \cdot h}{3}$	$V=\frac{h\cdot\left(A_b+A_B+\sqrt{A_b \cdot A_B}\right)}{3}$

cu noi totul pare mai usor

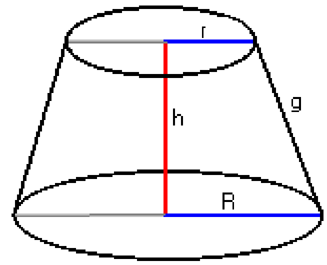
CILINDRUL ,CONUL ,TRUNCHIUL DE CON



CILINDRUL



CONUL



TRUNCHIUL DE CON

A= $2\pi Rg$

A_t= $2\pi R(g+R)$

V= $\pi R^2 h$

A_l= πRg

A_t= $\pi R(g+R)$

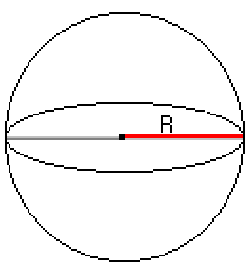
V= $\dfrac{\pi R^2 h}{3}$

A_l= $\pi g(R+r)$

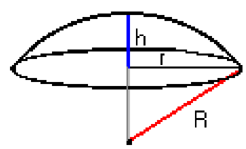
A_t= $\pi g(R+r)+\pi R^2+\pi r^2$

V= $\dfrac{\pi h(R^2+r^2+R\cdot r)}{3}$

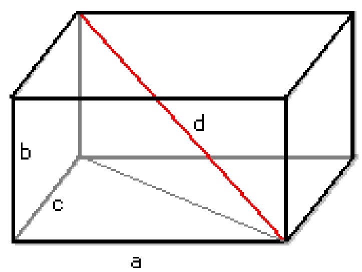
SFERA ,CALOTA SFERICA ,PARALELIPIPEDUL DREPTUNGHIC



SFERA



CALOTA SFERICA



PARALELIPIPEDUL DREPTUNGHIC

A_s= $4\pi R^2$

V_s= $\dfrac{4\pi R^3}{3}$

A_c= $2\pi Rh$

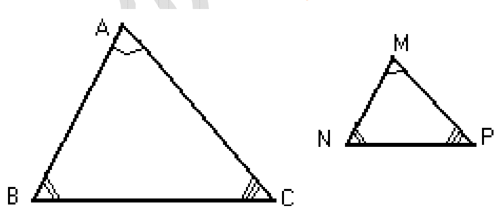
$R^2=r^2+(R-h)^2$

A_t= $2\cdot(ab+ac+bc)$

V= $a\cdot b\cdot c$

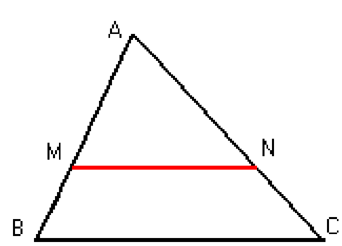
$d^2=a^2+b^2+c^2$

TRIUNGHIURI ASEMENEA ,TEOREMA LUI THALES



TRIUNGHIUL ABC ESTE ASEMENEA CU MNP

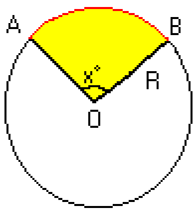
rezulta: $\dfrac{AB}{MN}=\dfrac{AC}{MP}=\dfrac{BC}{NP}$



BC || MN

rezulta: $\dfrac{AB}{AM}=\dfrac{AC}{AN}$

CERCUL



Daca $m\angle AOB = x^{\circ}$ atunci :

$L_c = 2\pi R$;

$L_{AB} = \dfrac{\pi R x^{\circ}}{180^{\circ}}$

$A_c = \pi R^2$;

$A_{OAB} = \dfrac{\pi R^2 x^{\circ}}{360^{\circ}}$