

FORMULE UTILE PENTRU CLASA A VIII A

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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

$$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b} ; \sqrt{a/b} = \sqrt{a} / \sqrt{b} ; \sqrt{x^2} = |x| ; (\sqrt{y})^2 = y ; a \geq 0 ; b \geq 0 ; y \geq 0 ; \text{exemple:}$$

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

$$(\sqrt{6})^2 = 6.$$

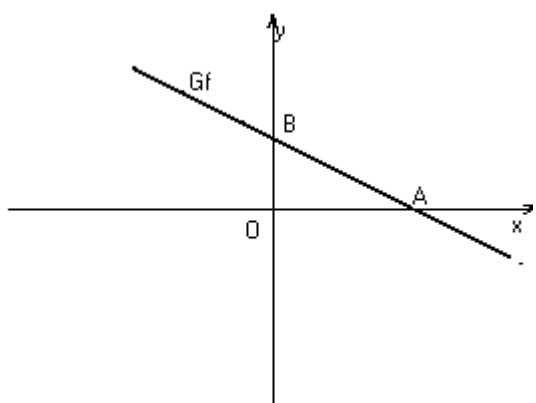
MODULUL

Definitie : $|X|=X$ daca $X \geq 0$ si $|X|=-X$ daca $X \leq 0$;

Proprietati : $|X| \geq 0$; $|a \cdot b| = |a| \cdot |b|$; $|a+b| \leq |a| + |b|$;

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

FUNCTIA LINIARA $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = ax + b$



$P(x,y) \in G_f$ 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 \mathbf{N} : $0, 1, 2, 3, 4, \dots, \infty$

Multimea numerelor intregi notata cu \mathbf{Z} : $-\infty \dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots, +\infty$

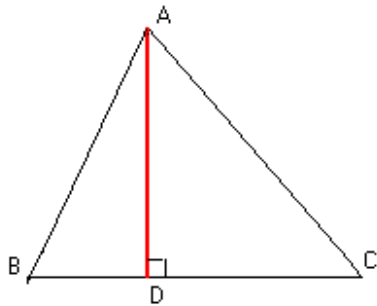
Multimea numerelor rationale notata cu \mathbf{Q} : exemple $-3/4 ; 5/2 ; -12/4 ; 0,23 ; -5,(24) ; 4,20(576) ;$

Multimea numerelor reale notata cu \mathbf{R} ; exemple : $-3/4 ; 5/2 ; -1/4 ; 7\sqrt{5} ; -\sqrt{6} ; -5,(24) ;$

$4,20(576) ; 0,202002000200\dots ; -5,2323323332333323\dots ;$

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

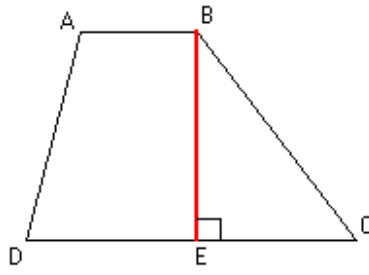
FIGURI PLANE REMARCABILE



TRIUNGIUL OARECARE

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

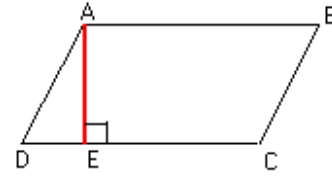
$$P_{\Delta ABC} = AB + BC + CA$$



TRAPEZUL

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

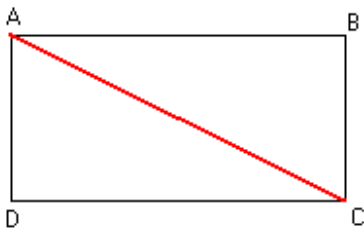
$$P_{ABCD} = AB + BC + CD + DA$$



PARALELOGRAMUL

$$A_{ABCD} = CD \cdot AE$$

$$P_{ABCD} = 2 \cdot (AB + BC)$$

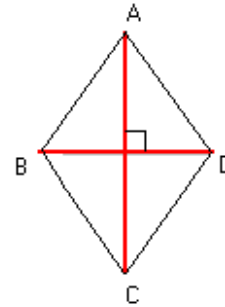


DREPTUNGIUL

$$A_{ABCD} = AB \cdot BC$$

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

$$P_{ABCD} = 2 \cdot (AB + BC)$$

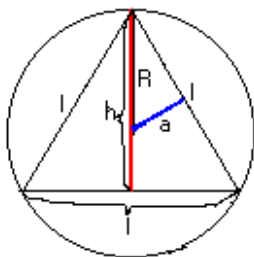


ROMBUL

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

$$P_{ABCD} = 4 \cdot AB$$

poligoane regulate : l=latura poligonului ; a=apotema poligonului ; A=aria ; P=perimetrul ;



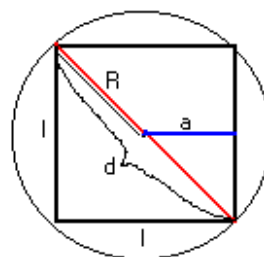
triunghiul echilateral

$$P=3 \cdot l$$

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

$$l=R\sqrt{3}$$

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



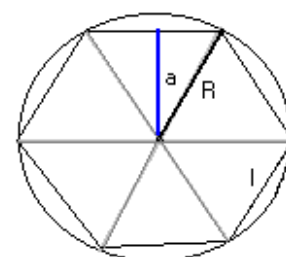
patratul

$$P=4 \cdot l$$

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

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

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



hexagonul regulat

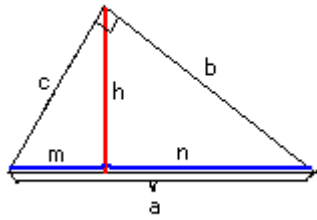
$$P=6 \cdot l$$

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

$$l=R$$

TRIUNGIUL DREPTUNGHIIC

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



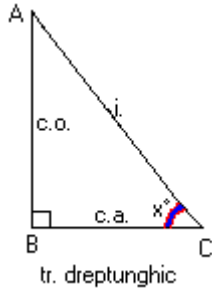
triunghiul dreptunghic

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

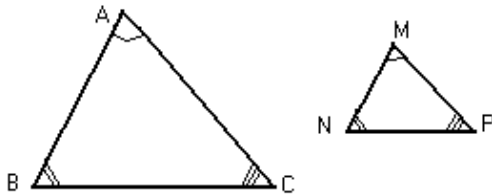


tr. dreptunghic

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

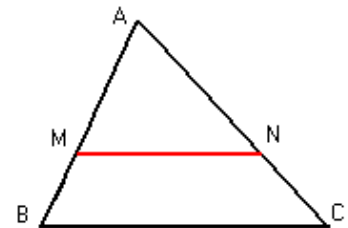
$$\sin x^\circ = \frac{\text{c.o.}}{i} = \frac{AB}{AC} \quad \cos x^\circ = \frac{\text{c.a.}}{i} = \frac{BC}{AC} \quad \text{tg } x^\circ = \frac{\text{c.o.}}{\text{c.a.}} = \frac{AB}{BC} \quad \text{ctg } x^\circ = \frac{\text{c.a.}}{\text{c.o.}} = \frac{BC}{AB}$$

TRIUNGIURI ASEMENEA ,TEOREMA LUI THALES



TRIUNGIUL ABC ESTE ASEMENEA CU MNP

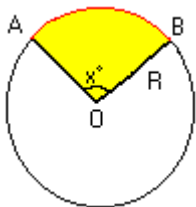
$$\text{rezulta: } \frac{AB}{MN} = \frac{AC}{MP} = \frac{BC}{NP}$$



BC || MN

$$\text{rezulta: } \frac{AB}{AM} = \frac{AC}{AN}$$

CERCUL



$$L_c = 2\pi R \quad ;$$

$$A_c = \pi R^2 \quad ;$$

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

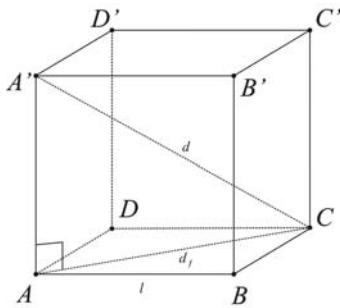
$$L_{AB} = \frac{\pi R x^\circ}{180^\circ}$$

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

FORMULE - CORPURI GEOMETRICE

I. POLIEDRE

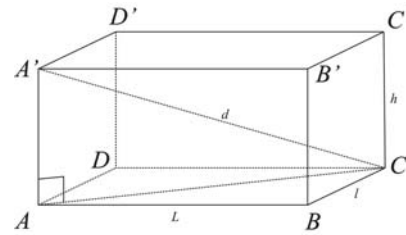
CUBUL



$$A_l = 4l^2; A_t = 6l^2; V = l^3$$

$$d_f = l\sqrt{2}; d = l\sqrt{3}$$

PARALELIPIPEDUL DREPTUNGHIIC

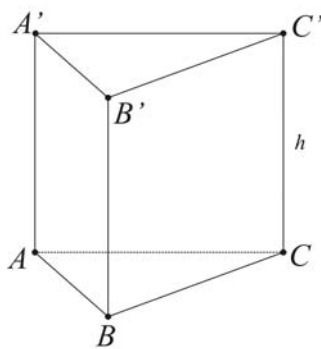


$$A_t = 2 \cdot (L \cdot l + L \cdot h + l \cdot h); V = L \cdot l \cdot h$$

$$d = \sqrt{L^2 + l^2 + h^2}$$

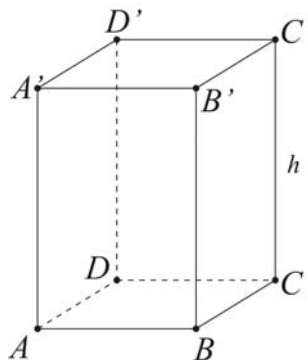
PRISMA REGULATĂ

TRIUNGHIULARĂ



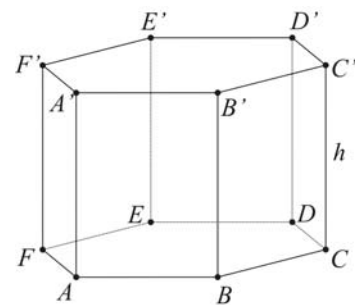
$$A_t = P_b \cdot h$$

PATRULATERĂ



$$A_t = A_l + 2 \cdot A_b$$

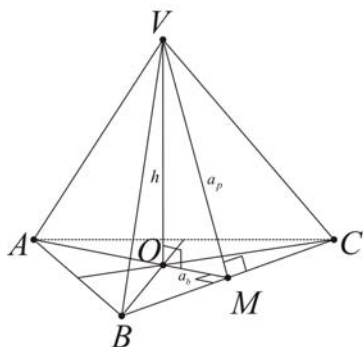
HEXAGONALĂ



$$V = A_b \cdot h$$

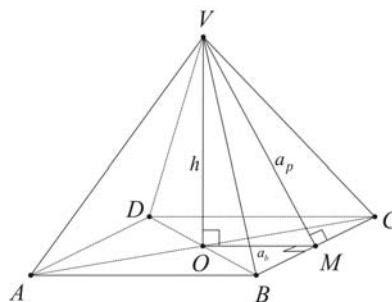
PIRAMIDA REGULATĂ

TRIUNGHIULARĂ



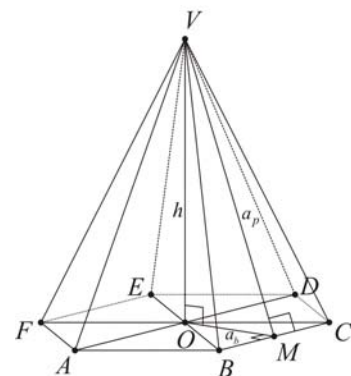
$$A_t = \frac{P_b \cdot a_p}{2}$$

PATRULATERĂ



$$A_t = A_l + A_b$$

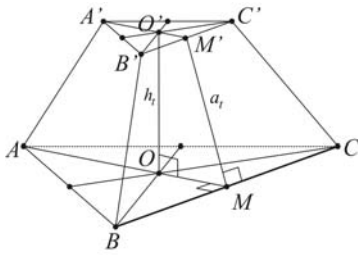
HEXAGONALĂ



$$V = \frac{A_b \cdot h}{3}$$

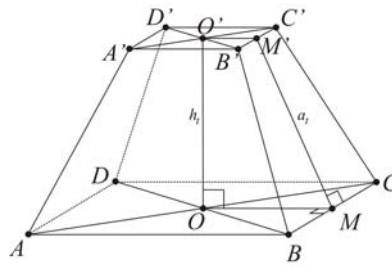
TRUNCHIUL DE PIRAMIDĂ REGULATĂ

TRIUNGIULARĂ



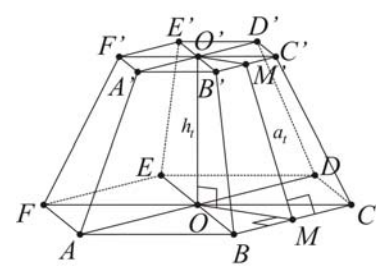
$$A_t = \frac{(P_B + P_b) \cdot a_t}{2}$$

PATRULATERĂ



$$A_t = A_l + A_B + A_b$$

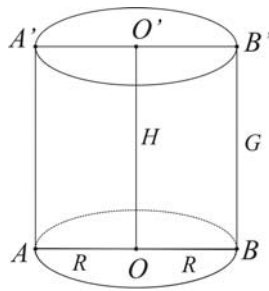
HEXAGONALĂ



$$V = \frac{h_t}{3} \cdot (A_B + A_b + \sqrt{A_B \cdot A_b})$$

II. CORPURI ROTUNDE

CILINDRUL

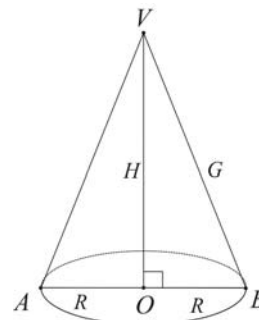


$$A_l = 2\pi R G$$

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

$$V = \pi R^2 H$$

CONUL

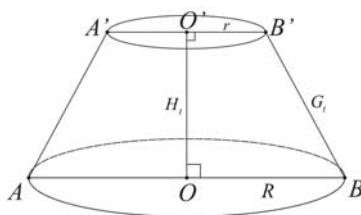


$$A_l = \pi R G$$

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

$$V = \frac{\pi R^2 H}{3}$$

TRUNCHIUL DE CON

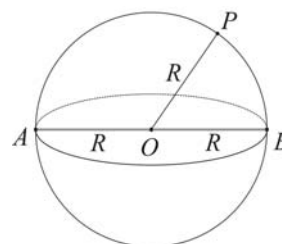


$$A_l = \pi G_t (R + r)$$

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

$$V = \frac{\pi H_t}{3} (R^2 + r^2 + Rr)$$

SFERA



$$A = 4\pi R^2$$

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