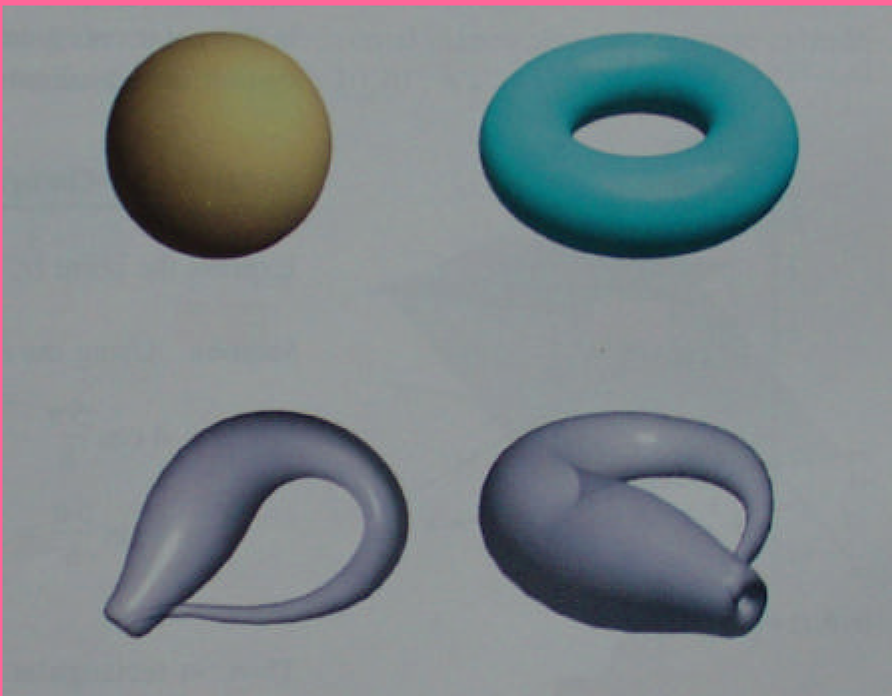
maTematika
biznesisaTvis



Tbilisi

2007

algebra

Semoklebuli gamravlebis formulebi

1. $a^2-b^2=(a-b)(a+b)$
2. $a^3\pm b^3=(a\pm b)(a^2\mp ab+b^2)$
3. $(a\pm b)^2=a^2\pm 2ab+b^2$
4. $(a\pm b)^3=a^3\pm 3a^2b+3ab^2\pm b^3$
5. $(a+b+c)^2=a^2+b^2+c^2+2ab+2ac+2bc$

proporciebi

Tu $\frac{a}{b}=\frac{c}{d}$, maSin $ad=bc$

$\frac{d}{b}=\frac{c}{a}$ $\quad\frac{a}{c}=\frac{b}{d}$ $\quad\frac{d}{c}=\frac{b}{a}$

$\frac{a\pm b}{b}=\frac{c\pm d}{d}$ $\quad\frac{a\pm b}{a}=\frac{c\pm d}{c}$

$\frac{a+b}{a-b}=\frac{c+d}{c-d}$

xarisxi

1. $a^n=\overbrace{a\cdot a\cdots a}^{n-\text{jer}},\quad n\in N$
2. $a^0=1,\ a\neq 0$
3. $a^{-n}=\frac{1}{a^n},\ a\neq 0,\ n\in N$
4. $a^{m/n}=\sqrt[n]{a^m},\ m\in Z,\ n\in N,\ a>0$

moqmedebebi xarisxebze

1. $(ab)^n=a^nb^n$
2. $\left(\frac{a}{b}\right)^n=\frac{a^n}{b^n},\ b\neq 0$
3. $a^m\cdot a^n=a^{m+n}$
4. $\frac{a^m}{a^n}=a^{m-n}$
5. $(a^m)^n=a^{mn}$

kvadratuli gantolebis amonaxsnTa formula

$$ax^2+bx+c=0,\ a\neq 0,\ D=b^2-4ac$$

1. $D\geq 0$ a) $x_{1,2}=\frac{-b\pm\sqrt{D}}{2a}$

   b) $x_{1,2}=\frac{-k\pm\sqrt{k^2-ac}}{a}$, $b=2k$
2. $D<0$ kvadratul gantolebas namdvil ricxvTa simravleSi amonaxsni ar gaaCnia

vietas Teorema

Tu x_1 da x_2 aris $ax^2+bx+c=0$ gantolebis amonaxsni, maSin

$$x_1+x_2=-\frac{b}{a},\quad x_1\cdot x_2=\frac{c}{a}$$

kvadratuli samwevris daSla mamravlebad

$$ax^2+bx+c=a(x-x_1)(x-x_2)$$

ariTmetikuli progresia

$a_n=a_1+(n-1)d;\quad S_n=\frac{2a_1+(n-1)d}{2}n$

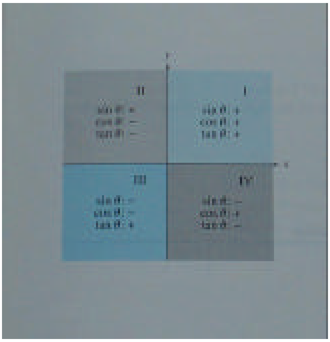
$S_n=\frac{2a_n-(n-1)d}{2}n\quad a_n=\frac{a_{n-1}+a_{n+1}}{2}$

geometriuli progresia

$b_n=b_1q^{n-1};\quad S_n=\frac{b_1(q^n-1)}{q-1}$

$S_n=\frac{b_nq-b_1}{q-1}\ (q\neq 1)\quad b_n^2=b_{n-1}\cdot b_{n+1}$

t r i g o n o m e t r i a

trigonometriul funqciaTa niSnebi	damokidebuleba erTi da igive argumentis trigono-metriul funqciebs Soris
	1. $\sin^2 a + \cos^2 a = 1$ 2. $\operatorname{tg} a = \dfrac{\sin a}{\cos a}$ 3. $\operatorname{ctg} a = \dfrac{\cos a}{\sin a}$ 4. $\operatorname{tg} a \cdot \operatorname{ctg} a = 1$ 5. $1+\operatorname{tg}^2 a = \dfrac{1}{\cos^2 a}$ 6. $1+\operatorname{ctg}^2 a = \dfrac{1}{\sin^2 a}$
ori argumentis jamisa da sxvaobis trigonometriuli funqciebi	**naxevari argumentis trigonometriuli funqciebi**
1. $\sin(a \pm b) = \sin a \cos b \pm \cos a \sin b$ 2. $\cos(a \pm b) = \cos a \cos b \mp \sin a \sin b$ 3. $\operatorname{tg}(a \pm b) = \dfrac{\operatorname{tg} a \pm \operatorname{tg} b}{1 \mp \operatorname{tg} a \operatorname{tg} b}$	1. $\sin^2 \dfrac{a}{2} = \dfrac{1-\cos a}{2}$ 2. $\cos^2 \dfrac{a}{2} = \dfrac{1+\cos a}{2}$ 3. $\operatorname{tg}^2 \dfrac{a}{2} = \dfrac{1-\cos a}{1+\cos a}$
ormagi argumentis trigonometriuli funqciebi	**trigonometriul funqciaTa gamosaxva naxevari argumentis tangensiT**
1. $\sin 2a = 2\sin a \cos a$ 2. $\cos 2a = \cos^2 a - \sin^2 a$ 3. $\operatorname{tg} 2a = \dfrac{2\operatorname{tg} a}{1-\operatorname{tg}^2 a}$	1. $\sin a = \dfrac{2\operatorname{tg}\frac{a}{2}}{1+\operatorname{tg}^2\frac{a}{2}}$ 2. $\cos a = \dfrac{1-\operatorname{tg}^2\frac{a}{2}}{1+\operatorname{tg}^2\frac{a}{2}}$ 3. $\operatorname{tg} a = \dfrac{2\operatorname{tg}\frac{a}{2}}{1-\operatorname{tg}^2\frac{a}{2}}$