QISQA KO`PAYTIRISH FORMULALARI

$$(a\pm b)^2=a^2\pm 2ab+b^2$$
$$(a\pm b)^3=a^3\pm 3a^2b+3ab\pm b^3$$
$$a^2-b^2=(a-b)(a+b)$$
$$a^3\pm b^3=(a\pm b)(a^2\mp ab+b^2)$$

KVADRAT TENGLAMA

$ax^2+bx+c=0$ *a,b,c-koeffitsiyentlar,* $a\neq 0$.

$$D=b^2-4ac$$

1. D>0 da, $x_{1,2}=\dfrac{-b\pm\sqrt{D}}{2a}$;

2. D=0 da, $x_1=x_2=-\dfrac{b}{2a}$;

3. D<0 da, ***haqiqiy yechimlarga ega emas.***

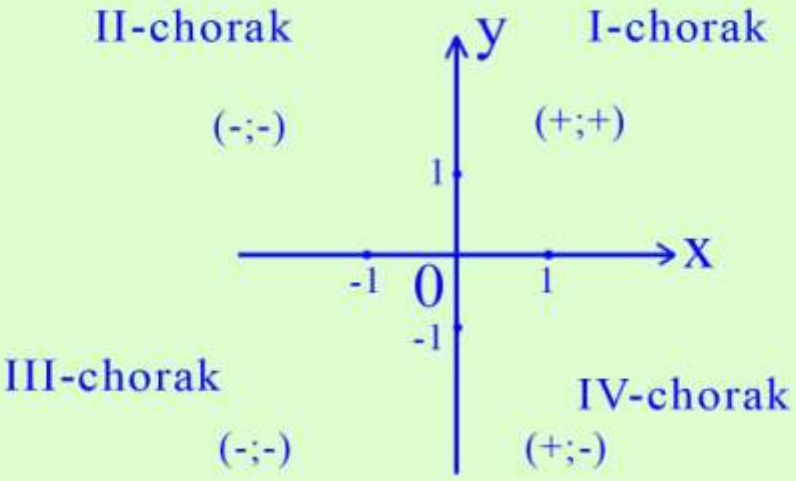
VIYET TEOREMASI

$$x^2+px+q=0$$
$$x_1+x_2=-p$$
$$x_1\cdot x_2=q$$

DARAJANI HISOBLASH JADVALI

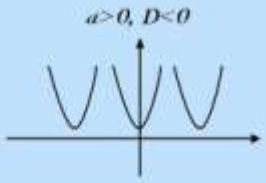
a^n	2	3	4	5	6	7	8	9	10
2	4	8	16	32	64	128	256	512	1024
3	9	27	81	243	729	2187	6561	19683	59049
4	16	64	256	1024	4096	16384	65536	262144	1048576
5	25	125	625	3125	15625	78125	390625	1953125	9765625
6	36	216	1296	7776	46656	279936	1679616	10077696	60466176
7	49	343	2401	16807	117649	823543	5764801	40353607	282475249
8	64	512	4096	32768	262144	2097152	16777216	134217728	1073741824
9	81	729	6561	59049	531441	4782969	43046721	387420489	3486784401
10	100	1000	10000	100000	1000000	10000000	100000000	1000000000	10000000000

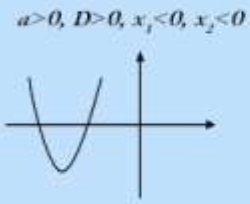
KOORDINATA TEKISLIGI

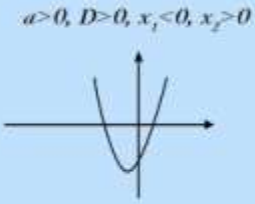


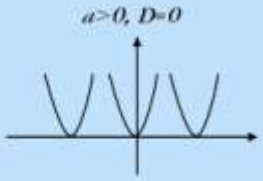
$Y=ax^2+bx+c$ funksiya grafiklari

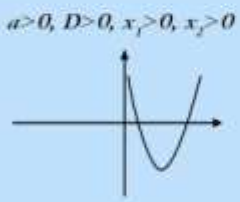
$D=b^2-4ac$ $\quad x_{1,2}=\dfrac{-b\pm\sqrt{D}}{2a}$

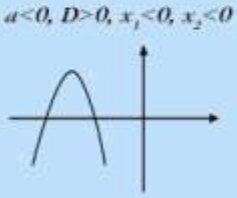


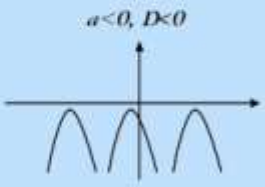


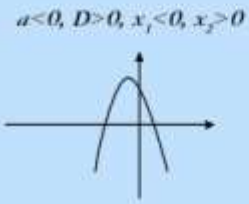


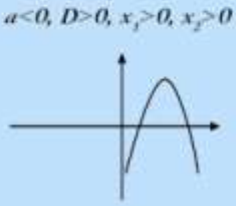


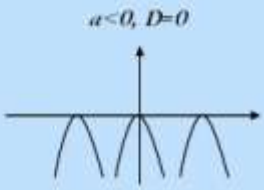




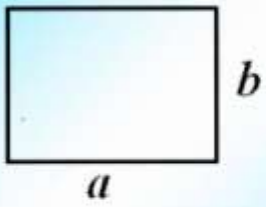








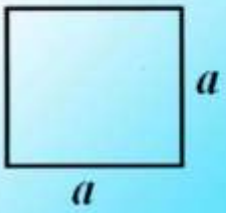
TO`G`RI TO`RTBURCHAK



$P=2(a+b)$

$S=a\cdot b$

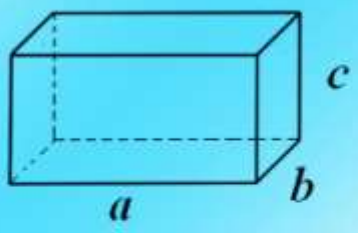
KVADRAT



$P=4a$

$S=a^2$

TO`G`RI TO`RTBURCHAKLI PARALLELOPIPED

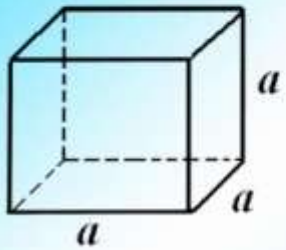


$l=4(a+b+c)$

$S=2(ab+ac+bc)$

$V=abc=S_{as}\,h$

KUB



$l=12a$

$S=6a^2$

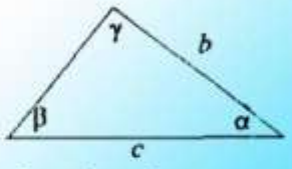
$V=abc$

UCHBURCHAKLAR

1) $S = \frac{a \cdot h_a}{2}$ $\qquad S = \frac{1}{2}ab\,Sin\gamma$

2) $S = \sqrt{p(p-a)(p-b)(p-c)}$

3) $S = \frac{abc}{4R} = pr$ $\qquad p = \frac{a+b+c}{2}$



$$a^2 = b^2 + c^2 - 2bc\,Cos\alpha$$

$$\frac{a}{Sin\alpha} = \frac{b}{Sin\beta} = \frac{c}{Sin\gamma} = 2R$$

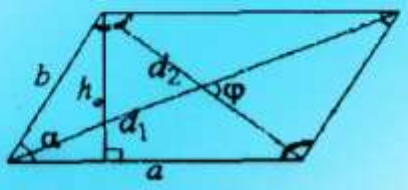
PARALLELOGRAMM

1) $P = 2(a+b)$;

2) $2a^2 + 2b^2 = d_1^2 + d_2^2$;

3) $S = a \cdot h_a = a \cdot b \cdot Sin\alpha$,

$S = \frac{1}{2}d_1 \cdot d_2 \cdot Sin\varphi$.

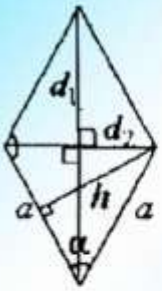


ROMB

1) $4a^2 = d_1^2 + d_2^2$;

2) $S = a \cdot h = 2a \cdot r = \frac{1}{2}d_1 \cdot d_2$,

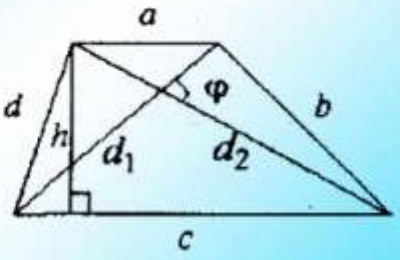
$S = a^2 \cdot Sin\alpha$



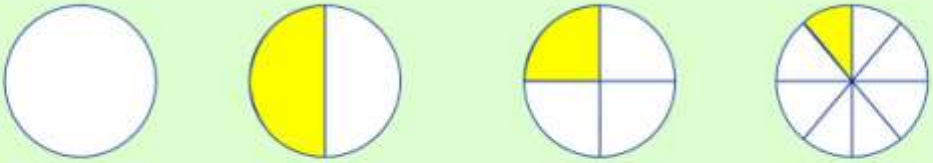
TRAPETSIYA

1) $S = mh = \frac{1}{2}d_1 \cdot d_2 Sin\varphi$

2) $d_1 = ab + \frac{c^2 a - d^2 b}{a-b}$



KASR SONLAR

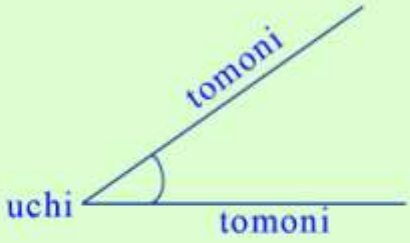


butun — 1 | yarim — $\frac{1}{2}$ | chorak — $\frac{1}{4}$ | nimchorak — $\frac{1}{8}$

masalan: $\frac{3}{1}$ kasrning surati
kasr chizig`i
kasrning maxraji

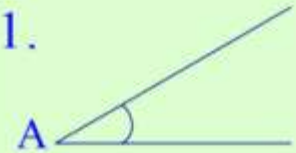
o`qilishi- “sakkizdan uch”

BURCHAKLAR

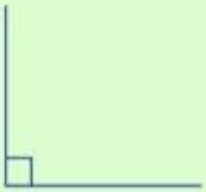


o`qilishi: $\angle$ AOB - burchak AOB

1.

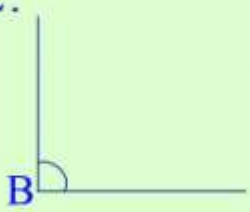


o`tkir burchak
$0 < \alpha < 90^0$



to`g`ri burchak
$\alpha = 90^0$

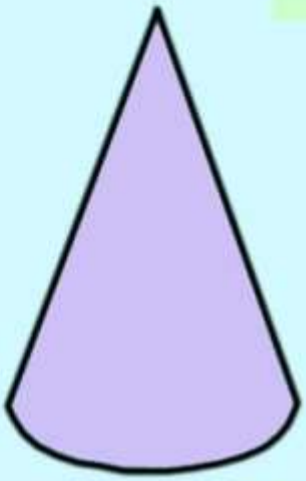
2.



o`tmas burchak
$90^0 < \alpha < 180^0$

yoyiq burchak
$\alpha = 180^0$

Konus

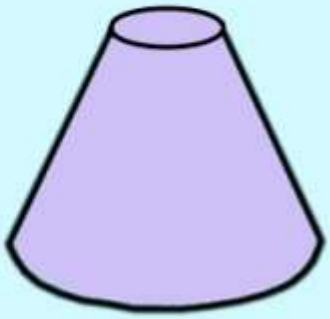


$$S_{yon} = \pi L(R + r)$$

$$S_{ts} = \pi R(R + L)$$

$$V = \frac{1}{3}\pi R^2 \cdot H$$

Kesik konus

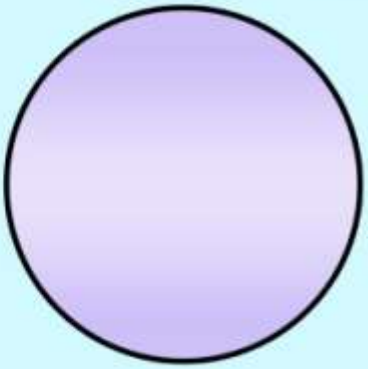


$$S_{yon} = \pi L(R+r)$$

$$S_{ts} = \pi L(R+r) + \pi R^2 + \pi r^2$$

$$V = \frac{1}{3}\pi H(R^2 + Rr + V^2)$$

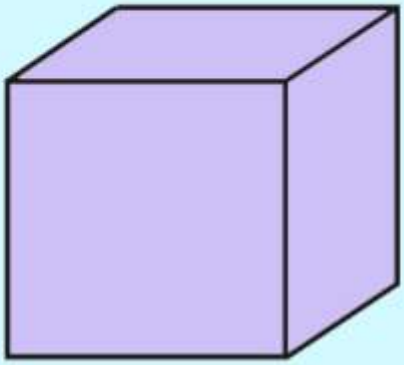
Shar



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

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

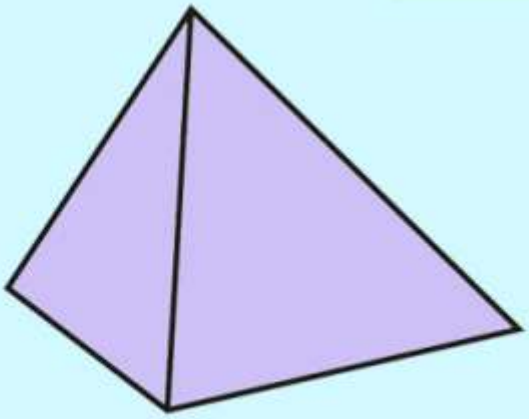
Kub



$S_{yon}=4a^2$ $S_{ts}=6a^2$

$V=a^3$

Piramida

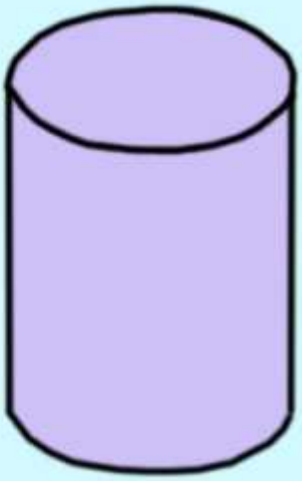


$$S_{yon}=\frac{a}{2}\cdot P$$

$$S_{ts}=S_{yon}+S_{asos}$$

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

Silindr



$$S_{yon}=\pi RL$$

$$S_{ts}=\pi R(R+L)$$

$$V=\frac{1}{3}\pi R^2\cdot H$$

Arifmetik progressiya

$$a_{n+1} = a_n + d$$

$$a_n = a_1 + d(n-1)$$

$$S_n = \frac{a_1 + a_n}{2} \cdot n$$

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

Geometrik progressiya

$$b_n = b_n q^{n-1}$$

$$S_n = \frac{b_n q - b_1}{q-1}$$

$$S_n = \frac{b_1(q^n - 1)}{q-1}$$

Logarifmlar

$a^{\log_a b} = b \quad \log_a 1 = 0;$

$$\log_a a = 1$$

$$\log_a b \cdot c = \log_a b + \log_a c$$

$$\log_a \frac{b}{c} = \log_a b - \log_a c$$

$$\log_a b^x = x \log_a b$$

$$\log_a b = \frac{\log_c b}{\log_c a}$$

ARIFMETIK PROGRESSIYA

$$a_{n+1}=a_n+d$$

$$a_n=a_1+d(n-1)$$

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

$$a_n=\frac{a_{n-1}+a_{n+1}}{2}=\frac{a_{n-k}+a_{n+k}}{2},\quad k\le n$$

GEOMETRIK PROGRESSIYA

$$b_n=b_1q^{n-1}$$

$$S_n=\frac{b_nq-b_1}{q-1}=\frac{b_1(q^n-1)}{q-1}=\frac{b_1(1-q^n)}{1-q},\quad q\neq 1$$

SONLI TENGSIZLIKLAR VA ULARNING XOSSALARI

1. $a>0,\ b>0$ bo'lsa, $a+b>0,\ ab>0,\ a:b>0$
2. $a<0,\ b<0$ bo'lsa, $a+b<0,\ ab>0,\ a:b>0$
3. $a>0,\ b<0$ bo'lsa, $ab<0,\ a:b<0,\ b:a<0$
4. $ab>0$ bo'lsa, $a>0,\ b>0$ yoki $a<0,\ b<0$
   $a:b>0$ bo'lsa, $a>0,\ b>0$ yoki $a<0,\ b<0$
5. $ab<0$ bo'lsa, $a>0,\ b<0$ yoki $a<0,\ b>0$
   $a:b<0$ bo'lsa, $a>0,\ b<0$ yoki $a<0,\ b>0$
6. $ab=0$ bo'lsa, $a=0,\ b=0$ yoki $a=0,\ b\neq 0$ yoki $a\neq 0,\ b=0$
7. $a:b=0$ bo'lsa, $a=0,\ b\neq 0$
8. $a-b>0$ bo'lsa, $a>b$; $a-b<0$ bo'lsa, $a<b$
9. $a>b,\ b>c\Rightarrow a>c$;
10. $a>b\Rightarrow a+c>b+c,\ a-c>b-c$
11. $a>b,\ c>0\Rightarrow ac>bc,\ a:c>b:c$
12. $a>b,\ c<0\Rightarrow ac<bc,\ a:c<b:c$
13. $a>b,\ c>d\Rightarrow a+c>b+d$
14. $a,b,c,d>0,\ a>b,\ c>d\Rightarrow ac>bd$
15. $a>b>0,\ r>0\Rightarrow a^r>b^r;\ r<0\Rightarrow a^r<b^r$

ASOSIY TRIGONOMETRIK AYNIYATLAR

1. $\sin^2\alpha+\cos^2\alpha=1$

2. $tg\alpha=\frac{\sin\alpha}{\cos\alpha}$

3. $ctg\alpha=\frac{\cos\alpha}{\sin\alpha}$

4. $tg\alpha=\frac{1}{ctg\alpha}$

5. $ctg\alpha=\frac{1}{tg\alpha}$

6. $tg\alpha\cdot ctg\alpha=1$

7. $1+tg^2\alpha=\frac{1}{\cos^2\alpha}$

8. $1+ctg^2\alpha=\frac{1}{\sin^2\alpha}$

IKKILANGAN BURCHAK FORMULALARI

1. $\sin2\alpha=2\sin\alpha\cos\alpha$

2. $\cos2\alpha=\cos^2\alpha-\sin^2\alpha=2\cos^2\alpha-1=1-2\sin^2\alpha$

3. $tg2\alpha=\frac{2tg\alpha}{1-tg^2\alpha}$ $x\neq\frac{\pi}{4}+\frac{\pi}{2}k$, $x\neq\frac{\pi}{2}+\pi n$, $k,n\in Z$

QO`SHISH FORMULALARI

1. $\sin(\alpha+\beta)=\sin\alpha\cos\beta+\sin\beta\cos\alpha$
2. $\sin(\alpha-\beta)=\sin\alpha\cos\beta-\sin\beta\cos\alpha$
3. $\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$
4. $\cos(\alpha-\beta)\ \cos\alpha\cos\beta+\sin\alpha\sin\beta$
5. $tg(\alpha+\beta)=\frac{tg\alpha+tg\beta}{1-tg\alpha tg\beta}$
6. $tg(\alpha-\beta)=\frac{tg\alpha-tg\beta}{1+tg\alpha tg\beta}$

YIG`INDINI KO`PAYTMAGA KELTIRISH

1. $\sin\alpha+\sin\beta=2\sin\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$
2. $\sin\alpha-\sin\beta=2\sin\frac{\alpha-\beta}{2}\cos\frac{\alpha+\beta}{2}$
3. $\cos\alpha+\cos\beta=2\cos\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$
4. $\cos\alpha-\cos\beta=-2\sin\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}$
5. $tg\alpha\pm tg\beta=\frac{\sin(\alpha\pm\beta)}{\cos\alpha\cos\beta}$
6. $ctg\alpha\pm ctg\beta=\frac{\sin(\beta\pm\alpha)}{\sin\alpha\sin\beta}$

TRIGONOMETRIK FUNKSIYALARNING BA`ZI QIYMATLARI

α°	α_{rad}	$\sin\alpha$	$\cos\alpha$	$\operatorname{tg}\alpha$	$\operatorname{ctg}\alpha$
0°	0	0	1	0	∞
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$
90°	$\frac{\pi}{2}$	1	0	∞	0
120°	$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$
135°	$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	-1
150°	$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$
180°	2π	0	-1	0	∞
210°	$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$
225°	$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	1
240°	$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$
270°	$\frac{3\pi}{2}$	-1	0	∞	0
300°	$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$
315°	$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	-1
330°	$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$
360°	2π	0	1	0	∞