MATEMATIKA-9

Diqqat! Eslatib o'tamiz, mazkur javoblar sizni vaqtingizni tejashga va imtihonlarga esa ko'proq tayyorlanish uchun yordam beradi. Vaqtni qo'ldan boy bermang, tayyorgarlikni hozirdan boshlang!

1 - bilet

1. Hisoblang: $\left(\frac{1}{4}-\frac{\frac{1}{4}+\frac{1}{9}}{\frac{1}{9}}\right):\left(\frac{2}{3}+\frac{\frac{7}{15}}{\frac{2}{5}-\frac{1}{6}}\right)=\left(\frac{1}{4}-\frac{\frac{13}{36}}{\frac{1}{9}}\right):\left(\frac{2}{3}+\frac{\frac{7}{15}}{\frac{7}{30}}\right)=\left(\frac{1}{4}-\frac{13}{4}\right):\left(\frac{2}{3}+2\right)=-\frac{12}{4}\cdot\frac{3}{8}=-1\frac{1}{8};$

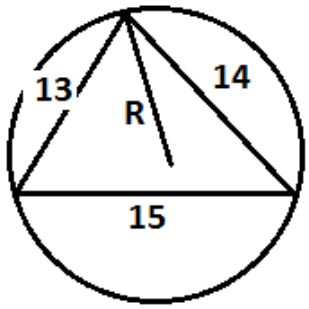
2. Ifodani soddalashtiring: $\left(\frac{y^2-x^2}{m^2-n^2}\cdot\frac{m+n}{x-y}-\frac{x}{n-m}\right)\cdot\frac{m-n}{2y}=\left(\frac{(y-x)(y+x)}{(m-n)(m+n)}\cdot\frac{m+n}{x-y}+\frac{x}{m-n}\right)\cdot\frac{m-n}{2y}=$

$=\left(-\frac{y+x}{m-n}+\frac{x}{m-n}\right)\cdot\frac{m-n}{2y}=\frac{-y-x+x}{m-n}\cdot\frac{m-n}{2y}=\frac{-y}{2y}=-\frac{1}{2};$

3. Arifmetik progressiyaning uchinchi va to'qqizinchi hadlari yig'indisi 8 ga teng. Shu progressiyaning dastlabki o'n bitta hadi yig'indisini toping.
$a_3+a_9=8;$ $S_{11}=a_1+a_2+a_3+\ldots+a_{10}+a_{11};$ $a_1+a_{11}=a_2+a_{10}=a_3+a_9=\ldots a_5+a_7=8;$
$a_6=(a_1+a_{11}):2=8:2=4;$ $S_{11}=5\cdot(a_1+a_{11})+a_6=5\cdot8+4=44;$

4. O'tkir burchak sinusi, kosinusi, tangensi va kotangensi ta'riflari.
To`g`ri burchakli uchburchak o`tkir burchagining sinusi deb, shu burchak qarshisidagi katetning gipotenuzaga nisbatiga aytiladi.
To`g`ri burchakli uchburchak o`tkir burchagining kosinusi deb, shu burchakka yopishgan katetning gipotenuzaga nisbatiga aytiladi.
To`g`ri burchakli uchburchak o`tkir burchagining tangensi deb, shu burchak qarshisidagi katetning yopishgan katetiga nisbatiga aytiladi.
To`g`ri burchakli uchburchak o`tkir burchagining kotangensi deb, shu burchakka yopishgan katetning qarshisidagi katetga nisbatiga aytiladi.

5. Tomonlari 13, 14, 15 ga teng bo'lgan uchburchakka tashqi chizilgan aylana radiusini toping.



$p=(a+b+c):2=(13+14+15):2=42:2=21.$ $S=\sqrt{p(p-a)(p-b)(p-c)}=$
$\sqrt{21(21-13)(21-14)(21-15)}=\sqrt{21\cdot6\cdot7\cdot8}=84\,kv.b.$
$R=\frac{a\cdot b\cdot c}{4S}=\frac{13\cdot14\cdot15}{4\cdot84}=\frac{65}{8}=8\frac{1}{8};$ Javob: $R=8\frac{1}{8}.$

2 - bilet

1. Hisoblang: $\frac{\left((5{,}2^2:2{,}6+8{,}1)^2-6{,}5^2\right):0{,}025}{\left(60{,}192:2{,}4-1{,}08\right)^2-0{,}24\cdot1400}=\frac{\left((10{,}4+8{,}1)^2-6{,}5^2\right):0{,}025}{\left(25{,}08-1{,}08\right)^2-336}=\frac{\left(18{,}5^2-6{,}5^2\right):0{,}025}{576-336}=$
$\frac{(18{,}5+6{,}5)(18{,}5-6{,}5)\cdot40}{240}=\frac{25\cdot12\cdot40}{240}=50;$

2. Ifodani soddalashtiring: $\frac{(2p-q)^2+2q^2-3pq}{2p^{-1}+q^2}:\frac{4p^2-3pq}{2+pq^2}$ va p=0,78, q=0,28 bo‘lganida uning qiymatini hisoblang. $\frac{(2p-q)^2+2q^2-3pq}{2p^{-1}+q^2}:\frac{4p^2-3pq}{2+pq^2}=\frac{4p^2-4pq+q^2+2q^2-3pq}{\frac{2}{p}+q^2}\cdot\frac{2+pq^2}{4p^2-3pq}=$

$\frac{4p^2-4pq+3q^2-3pq}{\frac{2+pq^2}{p}}\cdot\frac{2+pq^2}{p(4p-3q)}=\frac{4p(p-q)-3q(p-q)}{2+pq^2}\cdot\frac{2+pq^2}{4p-3q}=\frac{(4p-3q)(p-q)}{4p-3q}=$

p−q=0,78−0,28=0,5.

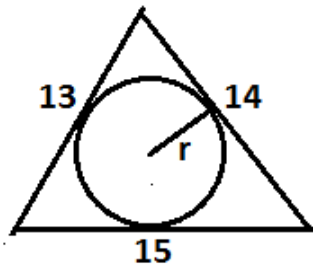
3. Dastlabki uchta hadining yig’indisi 9 ga, dastlabki oltita hadining yig’indisi -63 ga teng bo‘lgan arifmetik progressiyaning dastlabki o‘nta hadining yig’indisini toping.

$\begin{cases}S_3=9\\S_6=-63\end{cases}\Rightarrow\begin{cases}\frac{2a_1+2d}{2}\cdot 3=9\\\frac{2a_1+5d}{2}\cdot 6=-63\end{cases}\Rightarrow\begin{cases}2a_1+2d=6\\2a_1+5d=-21\end{cases}\rightarrow$ 5d−2d=−21−6; 3d=−27; d=−9; $2a_1+2(-9)=6$;

$2a_1-18=6$; $2a_1=24$; $a_1=12$; $S_{10}=\frac{2a_1+9d}{2}\cdot 10=(24-81)\cdot 5=-57\cdot 5=-285$;

4. Kosinuslar teoremasini ta’riflang va isbotlang.
Uchburchak istalgan tomonining kvadrati qolgan ikki tomoni kvadratlari yig`idisi shu ikki tomon bilan ular orasidagi burchak kosinusi ko`paytmasining ikkilangani ayirmasiga teng.
TEOREMA ISBOTI:
ABC uchburchakning BD balandligini o`tkazamiz. D nuqta AC tomonda yoki uning davomida bo`lishi mumkin. To`gri burchakli BCD uchburchakda Pifagor teoremasiga ko’ra, $BC^2=BD^2+DC^2$. DC=AC−AD bo`lgani uchun: $BC^2=BD^2+(AC-AD)^2=BD^2+AC^2-2\cdot AC\cdot AD+AD^2$. To`g`ri burchakli ABD uchburchakda $BD^2+AD^2=AB^2$ va AD=ABcosA ekanligini hisobga olib, oxirgi tenglikdan $BC^2=AB^2+AC^2-2\cdot AB\cdot AC\cdot cosA$, ya`ni $a^2=b^2+c^2-2\cdot bc\cdot cosA$ tenglikka ega bo`lamiz! TEOREMA ISBOTLANDI

5. Tomonlari 13, 14, 15 ga teng bo‘lgan uchburchakka ichki chizilgan aylana radiusini toping.



p=(a+b+c):2=(13+14+15):2=42:2=21. $S=\sqrt{p(p-a)(p-b)(p-c)}=$

$\sqrt{21(21-13)(21-14)(21-15)}=\sqrt{21\cdot 6\cdot 7\cdot 8}=84\,kv.b.$ $r=\frac{S}{p}=\frac{84}{21}=4\,b.$

3 – billet

1.Hisoblang: (0,8·7+0,64)·(1,25·7−0,8·1,25)+31,64=(5,6+0,64)·(8,75−1)+31,64=
=6,24·7,75+31,64=48,36+31,64=80.

2. Tenglamani yeching: $\frac{2}{x+2}-\frac{2}{4-x}=1-\frac{12}{x^2-2x-8}$; $\frac{2(x-4)}{(x+2)(x-4)}+\frac{2(x+2)}{x-4}=\frac{x^2-2x-8-12}{x^2-2x-8}$;

$\frac{2x-8+2x+4}{(x+2)(x-4)}=\frac{x^2-2x-20}{(x+2)(x-4)}$; $\frac{4x-4}{(x+2)(x-4)}=\frac{x^2-2x-20}{(x+2)(x-4)}$; $\begin{cases}4x-4=x^2-2x-20\\ x\neq -2;\quad x\neq -4\end{cases}\Rightarrow$

$\begin{cases}x^2-6x-16=0\\ x\neq -2;\quad x\neq -4\end{cases}\Rightarrow\begin{cases}x_1=-2;\quad x_2=8;\\ x\neq -2;\quad x\neq -4\end{cases}\rightarrow\ x=8;$

3. Arifmetik progrssiyada a_1=3, d=2 va S_n=80 bo‘lsa, n ni toping. $S_n=\frac{2a_1+(n-1)d}{2}\cdot n;$

$\frac{2\cdot 3+(n-1)\cdot 2}{2}\cdot n=80;$ (3+n−1)·n=80; $n^2+2n-80=0$; $n_1=-10$ chet ildiz; $n_2=8$;

J: n=8;

4. Sinuslar teoremasini ta’riflang va isbotlang.
Uchburchakning tomonlari qarshisidagi burchaklarning sinuslariga proporsional.
TEOREMA ISBOTI:
Uchburchak yuzini burchak sinusi orqali topish formulasiga ko`ra, S= 0,5· absinC, S= 0,5 bc·sinA, S=0,5ac ·sinB. Bu tenglillarning dastlabki ikkitasiga ko`ra, 0,5 ab·sinC= 0,5 bc·sinA, demak a/sina =c/sinC. Shuningdek, tengliklarning birinchi va uchunchidan c/sinC=b/sinB tenglikni hosil qilamiz. Shunday qilib, a/sinA= b/sinB= c/sinC.
TEOREMA ISBOTLANDI!

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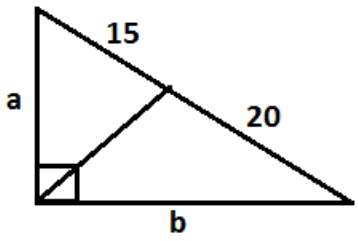
5. Uchburchak to‘gri burchagining bissektrisasi gipotenuzani 15 va 20 ga teng kesmalarda ajratadi. Ucburchakning yuzini toping.



a:b=15:20; 4a=3b; $a=\frac{3}{4}b$; Uchburchak to’g’ri burchakligidan:

$a^2+b^2=35^2$; $\left(\frac{3}{4}b\right)^2+b^2=35^2$; $\frac{9}{16}b^2+b^2=35^2$; $\frac{25}{16}b^2=35^2$;

$\frac{5}{4}b=35$; b=28; a=21. S=0,5·a·b=0,5·21·28=294kv.b.

Javob: S=294kv.b.

4 – billet

1.Hisoblang: $2{,}8:\left(2\frac{4}{5}\cdot\left(8{,}75-2\frac{1}{2}\right)\right)\cdot 7{,}25-3\frac{3}{4}:\left(\left(1{,}2+5\frac{1}{20}\right)\cdot 3{,}75\right)=$

$2{,}8:\left(\frac{14}{5}\cdot 6{,}25\right)\cdot 7{,}25-\frac{15}{4}:(6{,}25\cdot 3{,}75)=$ 2,8:17,5·7,25−3,75:23,4375=1,16−0,16=1.

2. $2x^2-5x+1=0$ tenglama ildizlari kvadratlarining yig’indisini toping.
Berilgan tenglama $x^2-2{,}5x+0{,}5=0$; keltirilgan tenglamaga teng kuchli. Viyet teoremasiga ko’ra: $x_1+x_2=2{,}5$; $x_1\cdot x_2=0{,}5$; $x_1^2+x_2^2=(x_1+x_2)^2-2x_1\cdot x_2=2{,}5^2-2\cdot 0{,}5=6{,}25-1=5{,}25$;

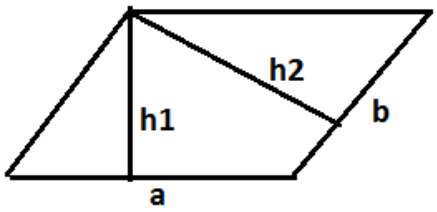
3. Sportchi birinchi minutda 400m, keying har bir minutda avvalgisiga qaraganda 5m dan kam yugurdi. Bir soatda qancha masofaga yugurgan?

a_1=400m; d=−5; 1soat=60 minut. $S_{60}=\frac{2a_1+59d}{2}\cdot 60=(2\cdot 400+59\cdot(-5)\cdot 30=(800-295)\cdot 30=$

$=505\cdot 30=15150m=15{,}15km.$

4. Uchburchak tashqi burchagining xossasini ta ’riflang va isbotlang.
Uchburchakning ichki burchagiga qo’shni bo`lgan burchak uchburchakning tashqi burchagi deb ataladi.
TEOREMA ISBOTI:
ABC uchburchakning B burchagiga tashqi bo`lgan CBD va ABE burchaklar chizamiz. Hosil bo`lgan burchaklar vertikal bo`lgani uchun o`zaro teng bo`ladi va bu tashqi burchak deb ataladi. TEOREMA ISBOTLANDI!

5. Parallelogrammning yuzi 30, balandliklari 4 va 6 ga teng.
Parallelogrammning perimetrini toping.
$S=h_1\cdot a=h_2\cdot b$; a=30:4=7,5; b=30:6=5;
P=2(a+b)=2(7,5+5)=25;
Javob: P=25;



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5 - bilet

1.Qo‘ziqorin quritilganda o‘z og’irligining 80% ini yo‘qatadi. 1kg qo‘ziqorin qoqi olish uchun necha kg qo‘ziqorinni quritish kerak ?

Qo‘ziqorinning 20% qo‘ziqorin qo‘qi bo’lar ekan: $\begin{vmatrix} 1kg.-0{,}2kg. \\ x\ -\ 1kg. \end{vmatrix}$ $x=\frac{1\cdot 1}{0{,}2}=5kg.$

2. Tenglamani yeching: $\frac{x}{x-10}-\frac{8}{x-6}=\frac{4x}{x^2-16x+60}$; $\frac{x(x-6)-8(x-10)}{(x-10)\cdot(x-6)}=\frac{4x}{(x-10)\cdot(x-6)}$;

$\frac{x^2-6x-8x+80}{(x-10)\cdot(x-6)}=\frac{4x}{(x-10)\cdot(x-6)}$; $\frac{x^2-14x+80-4x}{(x-10)\cdot(x-6)}=0$; $\frac{x^2-18x+80}{(x-10)\cdot(x-6)}=0$;

$\begin{cases} x^2-18x+80=0 \\ x\neq 10;\ \ x\neq 6; \end{cases}\Rightarrow\begin{cases} x_1=8;\ \ x_2=10; \\ x\neq 10;\ \ x\neq 6; \end{cases}\rightarrow x=8;$

3. Geometrik progressiyada $b_1+b_5=17$, $b_2+b_6=34$, b_1 ni toping.

$\begin{cases} b_1+b_5=17 \\ b_2+b_6=34 \end{cases}\Rightarrow\begin{cases} b_1+b_5=17 \\ b_1\cdot q+b_5\cdot q=34 \end{cases}\Rightarrow\begin{cases} b_1+b_5=17 \\ q(b_1+b_5)=34 \end{cases}\rightarrow$ q=2; $b_1+b_1\cdot q^4=17$; $b_1(1+2^4)=17$;

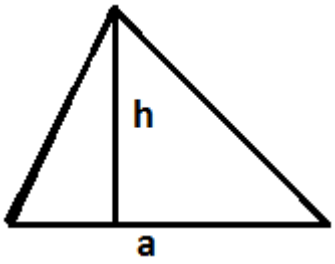
$17b_1=17$; $b_1=1$; Javob: $b_1=1$.

4. Muntazam ko‘pburchakning tomonlari bilan tashqi va ichki chizilgan aylana radiuslarini bog’lovchi formulalarni keltirib chiqaring.

β = ∠AOC= ½ ∠AOB= ½·360°/n = 180°/n;

R=OA=AC/sinβ = a_n/2·sin:180°/n; r=OC= AC/tgβ = a_n/2tg·180°:n ; r=OC=OA·cosβ=Rcos 180°:n . Muntazam uchburchaklar uchun: β=180°:3=60° ; R=a_3/2·sin60° =a_3:√3 ; r=a_3/2tg60°=a_3/2tg60°=a_3:2√3 ; R=2r Muntazam kvadratlar uchun: β=180°:4=45° ; R=a_4/2sin45°=a_4/2tg45° =a_4:2 ; R=r√2. Muntazam oltiburchak uchun: β=180°:6=30° ; R=a_6:2 sin30° ; r=a_6:2tg30° = a_6√3:2 ; R=2r:√3.

5. Uchburchak tomonlari 13, 14, 15 ga teng. Shu uchburchak barcha balandliklarining uzunliklari yig ‘indisini toping.



p=(a+b+c):2=(13+14+15):2=42:2=21. $S=\sqrt{p(p-a)(p-b)(p-c)}=$ $\sqrt{21(21-13)(21-14)(21-15)}=\sqrt{21\cdot 6\cdot 7\cdot 8}=84\,kv.b.$ $S=\frac{1}{2}a\cdot h;\ h=\frac{2S}{a};$

$h_1=\frac{2S}{a};\ h_2=\frac{2S}{b};\ h_3=\frac{2S}{c};\ h_1+h_2+h_3=2S\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)=2\cdot 84\left(\frac{1}{15}+\frac{1}{14}+\frac{1}{13}\right)=$

$=2\cdot 84\cdot\frac{14\cdot 15+15\cdot 13+15\cdot 14}{15\cdot 14\cdot 13}=2\cdot 6\cdot\frac{210+195+182}{13\cdot 15}=2\cdot 2\cdot\frac{587}{13\cdot 5}=\frac{2348}{65}=36\frac{8}{65};$

$Javob:\ h_1+h_2+h_3=36\frac{8}{65};$

6 - bilet

1.Sinf o‘quvchilaridan 12% yozma ishni umuman bajarmadi, 32% xatolar bilan qolgan 14 tasi esa to‘g‘ri bajardi. Sinfda nechta o‘quvchi bor?

14 ta o’quvchi: 100%−(12+32)%=56% bo’ladi. $\left|\begin{matrix}14-56\%\\ x-100\%\end{matrix}\right|$ $x=\frac{14\cdot 100}{56}=25;$

5

2. Tenglamalar sistemasining yechimini toping: $\begin{cases}\frac{1}{3}x+\frac{1}{4}y-2=0\\ 5x-y=11\end{cases}\Rightarrow\begin{cases}4x+3y-24=0\\ y=5x-11\end{cases}\Rightarrow$

4x+3(5x−11)−24=0; 4x+15x−33−24=0; 19x−57=0; 19x=57; x=3; y=5·3=11; y=4;

Javob: (3, 4);

3. Geometrik progressiyada $b_2+b_3=6$, $b_4-b_2=24$, b_4 ni toping.

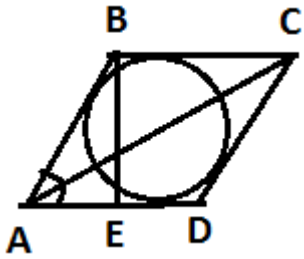
$\begin{cases}b_2+b_3=6\\ b_4+b_2=24\end{cases}\Rightarrow\begin{cases}b_1\cdot q+b_1\cdot q^2=6\\ b_1\cdot q^3+b_1\cdot q=24\end{cases}\Rightarrow\begin{cases}b_1\cdot q\cdot(1+q)=6\\ b_1\cdot q\cdot(q^2-1)=24\end{cases}\rightarrow\ \frac{q^2-1}{1+q}=4;\ \frac{(q-1)(q+1)}{q+1}=4;$

q−1=4; q=5; b_1·q·(1+q)=6; b_1·5·(1+5)=6; b_1=0,2; $b_4=b_1\cdot q^3$=0,2·125=25; J; b_4=25;

4. Ko‘pburchaklar o‘xshashligini ta’riflang. Uchburchaklar o‘xshashligining alomatlaridan birini isbotlang.

Bir xil nomli ko`pburchaklardan birining burchaklari ikkinchisining burchaklariga mos ravishda teng, mos tomonlari esa proporsional bo`lsa, bunday ko`pburchaklar o`xshash ko`pburchaklar deyiladi.

UCHBURCHAKLAR O`XSHASHLIGINING BIRINCHI ALOMATI:
Agar bir uchburchakning ikkita burchagi ikkinchi uchburchakning ikkita burchagiga mos ravishda teng bo`lsa, bunday uchburchaklar o`xshash bo`ladi..



5. Rombga ichki chizilgan aylananing radiusi 5 ga teng. Rombning burchaklaridan biri 60^0. Rombning katta diagonali uzunligini toping.
BE – romb balandligi. BE=2·r=2·5=10; To'g'ri burchakli Δ ABE dan:

$AB = \frac{BE}{\sin 60^\circ} = \frac{10}{\frac{\sqrt{3}}{2}} = \frac{20\sqrt{3}}{3}$; Teng yonli Δ ABC dan: $AC = AB \cdot \sqrt{3} = \frac{20\sqrt{3}}{3} \cdot \sqrt{3} = 20.$

Javob: AC=20;

7 - bilet

1.Maosh ikki marta ketma – ket bir xil (foizlarda) oshirilgach 1,44 marta ortdi. Maosh har gal necha foizdan oshirilgan.

Maosh 2 martqa bir xil n% ga oshirilgan bo'lsa: $\left(1+\frac{n}{100\%}\right)^2 = 1{,}44$; $1+\frac{n}{100\%} = \sqrt{1{,}44}$;

$1+\frac{n}{100\%} = 1{,}2$; $\frac{n}{100\%} = 0{,}2$; n=20%; Javob: 20%

6

2. Tengsizliklar sistemasini yeching: $\begin{cases} \frac{x+5}{4} - 2x > 0 \\ x - \frac{2x-4}{5} \ge 1 - 2x \end{cases} \Rightarrow \begin{cases} x+5-8x > 0 \\ 5x - 2x + 4 \ge 5 - 10x \end{cases} \Rightarrow$

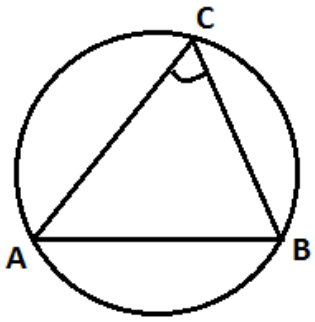
$\begin{cases} -7x > -5 \\ 3x + 10x \ge 5 - 4 \end{cases} \Rightarrow \begin{cases} 7x < 5 \\ 13x \ge 1 \end{cases} \Rightarrow \begin{cases} x < \frac{5}{7} \\ x \ge \frac{1}{13} \end{cases} \rightarrow \quad x \in \left[\frac{1}{13}; \frac{5}{7}\right);$

3. 1; -2; 4; -8 geometrik progressiyaning 11- hadini va 6 ta hadi yig'indisini toping.
$b_1=1$; $b_2=-2$; $q=b_2:b_1=-2:1=-2$; $b_{11}=b_1 \cdot q^{10}=1\cdot(-2)^{10}=1\cdot 1024=1024$;

$S_6 = \frac{b_1(q^6-1)}{q-1} = \frac{1\cdot((-2)^6-1)}{-2-1} = \frac{64-1}{-3} = -\frac{63}{3} = -21;$

4. Rombni ta'riflang. Romb diagonallari xossasi haqidagi teoremani isbotlang.
Tomonlari teng bo`lgan parallelogram romb deyiladi.
Rombning diagonallari o`zaro perpendicular va rombning burchaklarini teng ikkiga bo`ladi.
TEOREMA ISBOTI:
ABCD romb berilgan bo`lsin. AC_|_ BD va har bir diagonal rombning mos burchaklarini teng ikkiga bo`lishini isbotlaymiz:

Romb tarifiga ko`ra AB=AD, shuning uchun BAD Δteng yonli. Romb parallelogram bo`lgani uchun, aniq diagonallari kesishish nuqtasida teng ikkiga bo`lanadi, ya`ni BO=OD. Demak, Ao-teng yonli BAD uchburchakning medianasi. Teng yonli uchburchanning xossasiga ko`ra, uning asosiga o`tkazilgan mediana ham bissektrisa, ham balandlik bo`ladi. Shuning uchun, AC_|_ BD VA BAC=DAC.
TEOREMA ISBOTLANDI!



5. AB vatar aylanani 11 : 7 nisbatda bo‘ladi. Shu vatarda tiralgan ichki chizilgan burchaklardan kichigining gradus o‘lchovini toping.
Kichik AB yoy kattaligi: $\frac{360°\cdot 7}{11+7}=\frac{360°\cdot 7}{18}=20\cdot 7=140°;$
140^0 li yoyga tiralgan ichki chizilgan burchak shu yoy gradus o’lchovining yarmiga teng bo’ladi: ∠ACB=140^0:2=70^0;

8 - bilet

1.Mahsulotning narxi dastlab 20 % ga oshirildi, so‘ngra 20 % ga kamaytirildi. Dastlabki narxi necha foizga o‘zgargan?
Mahsulot narxi 20% ga oshirilsa, uning narxi avvalgi narxining 1,2 baravariga teng bo’ladi.
Bu narx 20% ga arzonlashtirilsa: $\begin{vmatrix}1{,}2-100\%\\ x-80\%\end{vmatrix}$ $x=\frac{1{,}2\cdot 80\%}{100\%}=0{,}96;$ Dastlabki narxining 96% ga teng bo’ladi. Natijada mahsulot narxi 4 foizga kamaygan bo’ladi.

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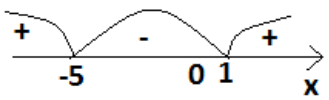
2. Tengsizlikni yeching: $\frac{x+3}{x+5}\le\frac{2}{3};$ $\frac{x+3}{x+5}-\frac{2}{3}\le 0;$ $\frac{3(x+3)-2(x+5)}{3(x+5)}\le 0;$ $\frac{3x+9-2x-10}{3(x+5)}\le 0;$
$\frac{x-1}{3(x+5)}\le 0;$ $\frac{x-1}{x+5}\le 0;$ $x\in(-5;1];$

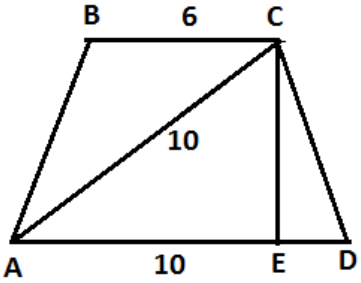


3. Agar geometrik progressiyada $b_1=2$, $b_7=1458$ bo‘lsa, uning maxrajini toping.
$b_7=b_1\cdot q^6$; $q^6=b_7:b_1=1458:2=728$; $q=\sqrt[6]{728}$; $q_1=-3$; $q_2=3$;

4. Uchburchak o‘rta chizig‘ini ta’riflang. Uchburchak o‘rta chizig‘i xossasini isbotlang.
Uchburchakning o`rtachizig`i deb, uning ikki tomoni o`rtalarini tutashtiruvchi kesmaga aytiladi.
Uchburchakning o`rtachizig`I uning uchinchi tomoniga parallel, uning uzunligi esa bu tomon uzunligining yarmiga teng.
TEOREMA ISBOTI:

D nuqta orqali AC tomonga parallel DE kesmanio`tkazamiz ya`ni DE||AC. Bu to`g`ri chiziq (fales teoremasiga ko`ra) BC kesmani teng ikkiga bo`ladi: CE=EB, ya`ni E nuqta orqali o`tadi va o`rta chiziqni o`z ichiga oladi. Demak DE o`rta chiziq AC tomonga parallel: DE||AC (yasashga ko`ra). TEOREMA ISBOTLANDI!.

5. Teng yonli trapetsiya asoslari 6 va 10, diagonali 10 ga teng. Trapetsiya yuzini toping.



CE- trapetsiya balandligini o'tkazamiz. $AE = \frac{AD+BC}{2} = 8;$

To'g'ri burchakli uchburchak ACE dan: $CE^2=AC^2-AE^2=$
$=10^2-8^2=100-64=36;$ $CE=6;$

$$S = \frac{AD+BC}{2} \cdot CE = 8 \cdot 6 = 48 kv.b.$$

9 - bilet

1.Uchta ketma – ket natural sonlar yig'indisi ularning eng kichigidan 13 ga otriq. Shu sonlarni toping.
Sonlaarning eng kichigi n bo'lsa navbatdagilari n+1 va n+2 bo'ladi. n+n+1+n+2=n+13; 3n+3=n+13; 2n=10; n=5; Javob: 5, 6, 7 sonlari

2. Proporsional bog'liq ikki x va y o'zgaruvchi berilgan. Agar x=2, y=6 ma'lum bo'lsa, y ning x ga bog'liqligini formula bilan ifodaning.
x:8=2:6; 6x=2y; y=3x;

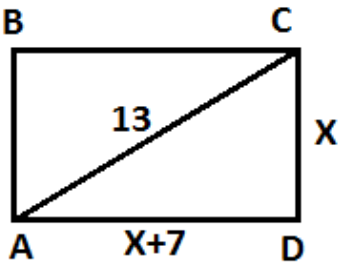
3. sinα=0,8 va π/2 < α < π berilgan. cosα, tgα, ctgα larning son qiymatini toping.
α burchak 2-chorak burchagi, bu chorakda cosα ning ishorasi manfiy bo'ladi:

$$\cos\alpha = -\sqrt{1-\sin^2\alpha} = -\sqrt{1-0{,}64} = -\sqrt{0{,}36} = -0{,}6; \quad tg\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{0{,}8}{-0{,}6} = -\frac{4}{3}; \quad ctg\alpha = \frac{1}{tg\alpha} = -\frac{3}{4};$$

4. Uchburchak ichki burchagi bissektrisasining xossasini ta'riflang va isbotlang.
Uchburcak burchagi bissektrisasining uchburchak ichida yotgan qizmi (kesmasi) Δichki bissektrisasi deyiladi.
TEOREMA ISBOTI: ABC uchburchakning B burchagining bissektrisasini o`tkazamiz. Uning AC tomon bilan kesishga nuqtasini L bilan belgilaymiz. Hosil bo`lgan BL kesma ABC uchburchakning ichki burchagi bissektrisasi deb ataladi. TEOREMA ISBOTLANDI!

5. To'g'ri to'rtburchakning diagonali 13 sm, qo'shni tomonlari ayirmasi 7 sm. Shu to'g'ri to'rtburchakning yuzini toping.

ACD to'g'ri burchakli uchburchakdan: $AC^2=AD^2+CD^2$;
$13^2=(x+7)^2+x^2$; $x^2+14x+49+x^2=169$; $2x^2+14x-120=0$;
$x^2+7x-60=0$; $x_1=-12$; chet ildiz. $x_2=5$sm. CD=5sm;
AD=CD+7=5+7=12sm. $S=AD\cdot CD=12\cdot 5=60sm^2$;



10 - bilet

1.Fermada tovuqlar va quyonlarning umumiy soni 1000 ta, oyoqlarining soni 3150 ta. Fermada nechta tovuq va nechta quyon bor?

x- tovuqlar, y- quyonlar soni deb belgilasak: $\begin{cases} x+y=1000 \\ 2x+4y=3150 \end{cases} \Rightarrow \begin{cases} x+y=1000 \\ x+2y=1575 \end{cases} \rightarrow y=575;$

x=1000−575=425; Javob: 425 ta tovuq, 575 ta quyon.

2. Ifodani soddalashtiring: $\left(\frac{x-3}{x^2+3x}-\frac{x}{9+3x}\right):\left(\frac{9}{x^3-9x}+\frac{1}{x+3}\right)=$

$$\left(\frac{x-3}{x(x+3)}-\frac{x}{3(x+3)}\right):\left(\frac{9}{x(x-3)(x+3)}+\frac{1}{x+3}\right)=\frac{3x-9-x^2}{3x(x+3)}:\frac{9+x(x-3)}{x(x-3)(x+3)}=$$

$$\frac{-x^2+3x-9}{3x(x+1)}\cdot\frac{x(x-3)(x+3)}{x^2-3x+9}=-\frac{1}{3}\cdot\frac{x-3}{1}=\frac{3-x}{3};$$

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3. Agar tgα=7 bo'lsa, $\frac{1+tg\alpha}{1-ctg\alpha}$ ni hisoblang.

$$ctg\alpha=\frac{1}{tg\alpha}=\frac{1}{7};\quad \frac{1+tg\alpha}{1-ctg\alpha}=\frac{1+7}{1-\frac{1}{7}}=\frac{7\cdot 8}{7-1}=\frac{56}{6}=\frac{28}{3}=9\frac{1}{3};$$

4. Pifagor teoremasini ta'riflang va isbotlang.
To`g`ri burchakli uchburchak gipotenuzasining kvadrati uning katetlari kvadratlarining yig`indisiga teng.
TEOREMA ISBOTI:
Katetlari a va b, gipotenuzasi c bo`lgan to`g`ri burchakli ABC uchburchak berilgan bo`lsin, u holda Pifagor teoremasi: $c^2=a^2+b^2$ formulasi bilan ifodalanadi, bunda a^2,b^2,c^2 –tomonlari a, b, c bo`lgan kvadratlarning yuzlariga teng. Shuning uchun bu tenglik tomoni gipotenuzaning uzunligiga teng kvadratning yuzi tomonlari katetlarga teng kvadratlarning yuzlari yig`indisiga teng ekanini ko`rsatadi. TEOREMA ISBOTLANDI!

5. Agar $\vec{a}(-2;3)$ va $\vec{b}(4;1)$ $bo'lsa$ $\vec{m}=2\vec{a}-3\vec{b}$ ning koordinatalarini aniqlang.

$$2\vec{a}=\overrightarrow{(-4:\ 6)};\quad 3\vec{b}=\overrightarrow{(12;\ 3)};\quad \vec{m}=\overrightarrow{(-4-12:\ 6-3)};=\overrightarrow{(-16:\ 3)};$$

11 – bilet

1. O'ylangan songa 7 qo'shib, hosil bo'lgan yig'indini 3 ga ko'paytirib, ko'paytmadan 47 ayirilsa, o'ylangan son hosil bo'ladi. O'ylangan sonni toping.

O'ylangan sonni a desak: (a+7)·3−47=a; 3a+21−47=a; 3a−a−26=0; 2a=26; a=13;

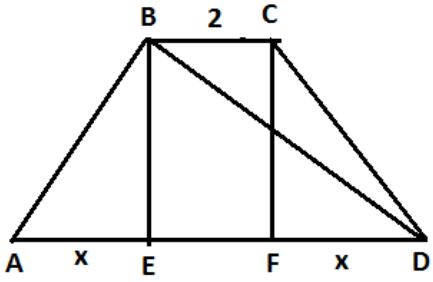
2. Agar 0,24:(4(0,5x−1,8)+1,2)−0,01=0,01 bo'lsa, x ni toping.
0,24:(2x−7,2+1,2)=0,01+0,01; 0,24:(2x−6)=0,02; 2x−6=0,24:0,02; 2x−6=12;
2x=12+6; 2x=18; x=18:2; x=9;

3. Soddalashtiring: $\frac{\cos\alpha}{1+\cos\alpha}-\frac{\cos\alpha}{1-\cos\alpha}=\frac{\cos\alpha\cdot(1-\cos\alpha)}{(1+\cos\alpha)\cdot((1-\cos\alpha))}-\frac{\cos\alpha\cdot(1+\cos\alpha)}{(1+\cos\alpha)\cdot((1-\cos\alpha))}=$

$=\frac{\cos\alpha-\cos^2\alpha-\cos\alpha-\cos^2\alpha}{1-\cos^2\alpha}=\frac{-2\cos^2\alpha}{\sin^2\alpha}=-2ctg^2\alpha;$

4. Uchburchak ichki burchaklarining yig'indisi haqidagi teoremani keltiring va isbotlang.
To`g`ri burchakli uchburchakning ikkita o`tkir burchaklar yig`indisi 90°ga teng.
TEOREMA ISBOTI:
Haqiqatan, uchburchak ichki burchaklarining yig`indisi 180° ga teng. To`gri burchakli uchburchakning bitta burchagi esa, 90° ga teng. Shuning uchun uning qolgan ikki burchaklari yig`indisi 90° ga teng. TEOREMA ISBOTLANDI.

5. Teng yonli trapetsiyaning diagonali yon tomoniga perpendikulyar. Trapetsiyaning balandligi $\sqrt{24}\,sm$, kichik asosining uzunligi 2 sm. Trapetsiyaning katta asosi uzunligini toping.



ABD to'g'ri burchakli uchburchakdan: $BE^2=AE\cdot ED=x\cdot(x+2)$
$x^2+2x=24$; $x^2+2x-24=0$; $x_1=-6$; chet ildiz; $x_2=4$;
AD=AE+EF+FD=x+2+x=4+2+4=10sm. Javob: AD=10sm.

12 – bilet

1. 150 sonini a) 2, 3, 5 sonlariga proporsional; b) $2;\frac{2}{5};\frac{1}{2}$ sonlariga teskari proporsional qismlarga bo'ling.
a) 2+3+5=10; 150:10=15; 2·15=30; 3·15=45; 5·15=75; Javob: 15, 45, 75;

b) $2;\frac{2}{5};\frac{1}{2}$ sonlariga teskari proporsional qismlarga bo'lish 0,5; 2,5; 2 sonlariga to'g'ri proporsional qismlarga bo'lish demakdir. 0,5+2,5+2=5; 150:5=30; 30·0,5=15; 30·2,5=75; 30·2=60; Javob: 15, 75, 60;

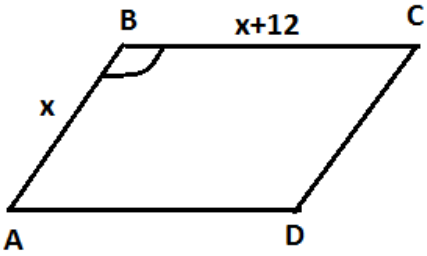
2. Kasrni qisqartiring: $\frac{2y^2+8y-90}{3y^2-36y+105}=\frac{2\left(y^2+4y-45\right)}{3\left(y^2-12y+35\right)}=\frac{2(y+9)\cdot(y-5)}{3(y-7)\cdot(y-5)}=\frac{2(y+9)}{3(y-7)};$

3. Poyezd stansiyadan 20 minut kech chiqib 160 km masofani tezligini jadvaldagidan 16 km/soat oshirib manzilning oxiriga yetib keldi. Bu manzilda poyezdning tezligi qanday ?

20 minut=1/3 soat; s=160km; $\frac{s}{v}=\frac{s}{v+16}+\frac{1}{3}$; $\frac{160}{v}=\frac{160}{v+16}+\frac{1}{3}$;
160·3·(v+16)=160·3·v+v(v+16); 480v+480·16=480v+v²+16v; v²+16v−7680=0; v_1=−96; chet ildiz; v_2=80. Bu masofada poyezd tezligi 80+16=96km/soat bo'lgan.

4. Uchburchak yuzini tomoni va balandligiga ko'ra ta'riflang. Uchburchak yuzining formulasini tomoni va balandligiga ko'ra keltirib chqaring.
Uchburchakning yuzi uning asosi bilan balandligi ko`paytmasinig yarmiga teng: S= 0,5· a·h
TEOREMA ISBOTI:
Teoremani isbot qilish uchun A nuqtadan BC tomonga parallel *l* to`g`ri chiziq o`tkazamiz. So`ngra *l* ga CP va BN perpendikularlarni tushiramiz. Bunda CBNP to`g`ri to`rtburchak hosil bo`ladi. Ma`lumki, bu to`g`ri to`rtburchakning yuzi a·h ga teng. Ammo hosil bo`lgan shaklda ΔADC=ΔCPA va ΔBDA=ΔANB, chunki ular jufti-jufti bilan to`g`ri to`rtburchaklarning dioganallari kesishishidan hosil bo`lgan uchburchaklar. Bundan CBNP to`g`ri burchakning yuzi berilgan uchburchak yuzidan ikki barobar katta ekanini hosil qilamiz, ya`ni 2S=a·h. Bundan, S= ah/2 . TEOEMA ISBOTLANDI!

5. Parallelogramm tomonlarining uzunliklari 7 : 3 kabi nisbatda bo'lib, bir tomoni ikkinchisidan 12sm kam. Agar parallelogrammning burchagi 120° bo'lsa, uning yuzini toping.



(x+12):x=7:3; 3x+36=7x; 4x=36; x=9; AB=9sm;
BC=21sm; $S = AB \cdot BC \cdot \sin 120° = 9 \cdot 21 \cdot \frac{\sqrt{3}}{2} = \frac{189\sqrt{3}}{2} sm^2$;

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13 – bilet

1. Birinchi brigadada ikkinchiga qaraganda 3 ishchi kam, ikkinchi brigadada esa uchinchi brigadada qaraganda 5 ishchi ortiq. Agar uchta brigadada hammasi bo'lib 52 ishchi bo'lsa, har bir brigadada nechtadan ishchi bor?
1-brigadadagi ishchilar sonini x deb olsak, 2-brigadada x+3, 3-brigadada x+3−5=x−2;
x+(x+3)+(x−2)=52; 3x+1=52; 3x=51; x=17; Javob: 17; 20; 15 tadan ishchi bor.

2. y=(2x−5)(3+8x)−(1−4x)² formula bilan berilgan funksiyaning chiziqli funksiya ekanligini isbotlang. Funksiyaning grafigi A(−1; 10) va B(0; 16) nuqtalarga tegishlimi?
(2x−5)(3+8x)−(1−4x)² =6x+16x²−15−40x−(1−8x+16x²)=16x²−34x−15−1+8x−16x²=
=−26x−16; y=−26x−16 chiziqli funksiya.
A(−1; 10): y(−1)=−26·(−1)−16=26−16=10. A nuqta funksiya grafigiga tegishli.
B(0; 16): y(0)=−26·0−16=0−16=−16; B nuqta funksiya grafigiga tegishli emas.

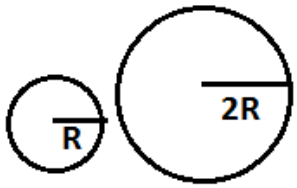
3. Ayniyatni isbotlang: $\frac{(\sin\alpha+\cos\alpha)^2-1}{ctg\alpha-\sin\alpha\cdot\cos\alpha}=2tg^2\alpha$

$$\frac{(\sin\alpha+\cos\alpha)^2-1}{ctg\alpha-\sin\alpha\cdot\cos\alpha}=\frac{\sin^2\alpha+2\sin\alpha\cdot\cos\alpha+\cos^2\alpha-1}{\frac{\cos\alpha}{\sin\alpha}-\sin\alpha\cdot\cos\alpha}=\frac{1+2\sin\alpha\cdot\cos\alpha-1}{\frac{\cos\alpha-\sin^2\alpha\cdot\cos\alpha}{\sin\alpha}}=\frac{2\sin^2\alpha\cdot\cos\alpha}{\cos\alpha-\sin^2\alpha\cdot\cos\alpha}=$$

$$=\frac{2\sin^2\alpha\cdot\cos\alpha}{\cos\alpha(1-\sin^2\alpha)}=\frac{2\sin^2\alpha\cdot\cos\alpha}{\cos\alpha\cdot\cos^2\alpha}=\frac{2\sin^2\alpha}{\cos^2\alpha}=2tg^2\alpha;$$

4. Trapetsiya yuzi haqidagi teoremani ta'riflang va isbotlang.
Trapetsiyaning yuzi uning asoslari yig`indising yarmi bilan balandligi ko`paytmasiga teng: S=(a/2+b/2)·h
TEOREMA ISBOTI:
Asoslari AD=a, BC=b va balandligi CE=h bo`lgan ABCD trapetsiya. Trapetsiyada AD dioganalni o`tkazamiz. Bunda ABCD trapetsiya ABC va ACD uchburchaklarga ajratadi. Trapetsiya yuzi esa bu uchburchaklar yuzlari yig`indisiga teng bo`ladi. Parallel to`g`ri chiziqlar orasidagi masofa o`zgarmas bo`lgani uchun ABC va ACD uchburchaklarning balandliklari o`zaro teng. Bundan, $S_{ABC}$ = ½ BC·CE= ½ b·h va $S_{ACD}$= ½ AD·CE= ½ a·h. Trapetsiyaning yuzi $S=S_{ABC}+S_{ACD}$ ya`ni: S= ½ a·h+ ½ b·h yoki S=(a/2+b/2)·h.
TEOREMA ISBOTLANDI!

5. Ikki doira radiuslari 1 : 2 kabi nisbatda. Agar katta doira aylanasining uzunligi $8\sqrt{\pi}$ sm bo'lsa, kichik doira yuzini toping.



$$l=2\pi\cdot 2R=8\sqrt{\pi};\quad 4\pi\cdot R=8\sqrt{\pi};\quad R=\frac{2\sqrt{\pi}}{\pi};\quad S=\pi\cdot R^2=\pi\cdot\frac{4\pi}{\pi^2}=4sm^2;$$

14 – bilet

1. Har birida 800 gr dan katta va har birida 400 gr dan kichik qutilarda konfet sotib olindi. Agar konfetlarning umumiy og'irligi 4 kg bo'lsa, har bir turdagi qutidan nechtadan sotib olingan ?
Katta qutilar soni n, kichik qutilar soni m bo'lsin, n va m manfiy bo'lmagan butun sonlar.0,8·n+0,4·m=4 dan: n≤5, m≤4 kelib chiqadi.
1) n=0: m=10; 2) n=1: m=8; 3) n=2: m=6; 4) n=3: m=4; 5) n=4: m=2; 6) n=5: m=0;

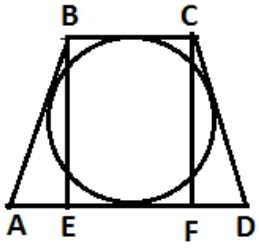
2. Ifodaning qiymatini toping (3n−1)(n+1)+(2n−1)(n−1)−(3n+5)(n−2) , bunda n=−3,5
$(3n-1)(n+1)+(2n-1)(n-1)-(3n+5)(n-2)=3n^2+3n-n-1+2n^2-2n-n+1-3n^2+6n-5n+10=$
$=2n^2+10=2\cdot(-3{,}5)^2+10=2\cdot 12{,}25+10=24{,}5+10=34{,}5;$

3. Ayniyatni isbotlang: $\frac{tg(180°-\alpha)\cdot\cos(180°+\alpha)}{tg(270°+\alpha)\cdot\cos(270°-\alpha)}=tg\alpha$

$$\frac{tg(180°-\alpha)\cdot\cos(180°+\alpha)}{tg(270°+\alpha)\cdot\cos(270°-\alpha)}=\frac{-tg\alpha\cdot(-\cos\alpha)}{-ctg\alpha\cdot(-\sin\alpha)}=\frac{\frac{\sin\alpha}{\cos\alpha}\cdot\cos\alpha}{\frac{\cos\alpha}{\sin\alpha}\cdot\sin\alpha}=\frac{\sin\alpha}{\cos\alpha}=tg\alpha;$$

4. Teng yonli uchburchak asosidagi burchaklarning tengligi haqidagi teoremani ta'riflang va isbotlang.
Teng yonli uchburchaklarning asosidagi burchaklari teng.
TEOREMA ISBOTI: Aytaylik, AL-ABC uchburchakning bissektrisasi bo`lsin. ABL va ACL uchburchaklarni qaraymiz. Birinchidan, AL tomon umumiy, ikkinchidan, teorema shartiga ko`ra AB=AC va ΔABC- teng yonli. Uchinchidan, 2∠=1∠, chunki AL-bissektrisa. Demak, uchburchaklar tengligining TBT alomatiga ko`ra, ΔABL=ΔACL bo`ladi.
TEOREMA ISBOTLANDI!

5. Doiraga tashqi chizilgan teng yonli trapetsiyaning asoslari 3,6 sm va 10 sm. Doira yuzini toping.



BC=3,6sm. AD=10sm. AB=CD. Aylanaga tashqi chizilgan to'rtburchak qarama-qarshi tomonlari yig'indisi teng bo'ladi. AB=CD=(AD+BC):2=13,6:2=6,8sm. AE=(AD−BC):2=(10−3,6):2= =6,4:2=3,2sm. To'g'ri burchakli Δ ABE dan: $BE^2=AB^2-AC^2=$ $=6,8^2-3,2^2=46,24-10,24=36$; BE=6sm. r=BE:2=6:2=3sm. $S=\pi\cdot r^2=9\pi\, sm^2$;

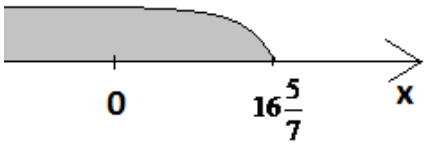
Javob: $S=9\pi$ sm^2;

15 – bilet

1. Sotuvchi 300 ta chinni guldan har birida 5 ta dan va har birida 7 tadan qilib 50 ta guldasta tayyorladi. Sotuvchi har bir turdagi guldastadan nechtadan tayyorlagan?

5 ta gulli guldastalar sonini x bilan, 7 ta gulli guldastalar sonini y bilan belgilasak:
$\begin{cases}x+y=50\\5x+7y=300\end{cases}\Rightarrow\begin{cases}x=50-y\\5(50-y)+7y=300\end{cases}\rightarrow$ 250−5y+7y=300; 2y=300−250; 2y=50; y=25;
x=50−25=25; Javob: Har biridan 25 tadan.

2. Tengsizlikni yeching va yechimni son o'qida tasvirlang $\frac{x-3}{8}+5<\frac{3x+127}{20}-\frac{x+9}{12}$
Tengsizlik ikkala qismini 120 ga ko'paytiramiz: 15·(x−3)+5·120<6(3x+127)−10(x+9);
15x−45+600<18x+762−10x−90; 15x−8x<672−555; 7x<117; $x<\frac{117}{7}$; $x<16\frac{5}{7}$;

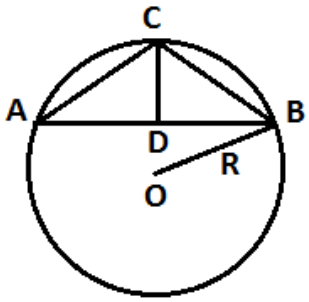


3. Soddalashtiring: $(\cos18°\cos7°-\sin18°\sin7°)^2+(\sin15°\cos10°+\cos15°\sin10°)^2=$ $=(\cos(18°+7°))^2+(\sin(15°+10°))^2=\cos^225°+\sin^225°=1$;

4. To'g'ri to'rtburchakni ta'riflang. To'g'ri to'rtburchak diagonallarining xossasini isbotlang.
Hamma burchaklari to`g`ri bo`lgan parallelogram to`g`ri to`rtburchak deb ataladi.
To`gri to`rtburchak diagonallari o`zaro teng.

TEOREMA ISBOTI: To`g`ri burchakli ACD va DBA uchburchaklar ikkita katetiga ko`ra teng. Bundan, bu uchburchaklar gipotenuzalarining tengligi, ya`ni AC=BD kelib chiqadi. TEOREMA ISBOTLANDI!

5. Asosining uzunligi 16sm va balandligi 4sm bo‘lgan teng yonli uchburchakka tashqi chizilgan aylana radiusini toping.



AD=AB:2=16:2=8sm. AC=BC; $AC^2=AD^2+CD^2=8^2+4^2=64+16=80$;

$AC = BC = \sqrt{80} = 4\sqrt{5}\ sm.$ $S_\Delta=0{,}5\cdot AB\cdot CD=0{,}5\cdot 16\cdot 4=32sm^2$;

$$R = \frac{abc}{4S} = \frac{AC\cdot BC\cdot AB}{4\cdot 32} = \frac{4\sqrt{5}\cdot 4\sqrt{5}\cdot 16}{4\cdot 32} = 10\,sm.$$

16 – bilet

1. Kater oqimga qarshi 10 soatda yurgan yo’ldan oqim bo‘ylab 6 soatda 20 km kam masofani bosib o‘tadi. Agar katerning turg‘un suvdagi tezligi 15 km/soat bo‘lsa, daryo oqimining tezligini toping.

Kater oqimga qarshi 10 soatda yurgan yo’lini S, daryo oqimi tezligini v bilan belgilasak: $(15-v)\cdot 10=S$; $(15+v)\cdot 6=S-20$; $(15-v)\cdot 10=(15+v)\cdot 6+20$; $150-10v=90+6v+20$; $6v+10v=150-90-20$; $16v=40$; $v=40:16$; $v=2{,}5$km/soat.

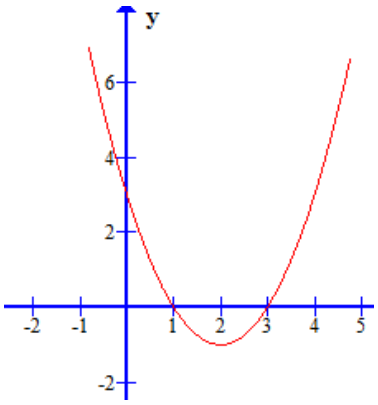
2. $\frac{3x-7}{4} < \frac{2x-3}{5}+1$ tengsizlikning natural yechimlarini toping.

Tengsizlikning ikkala qismini 20 ga ko’paytiramiz: $5(3x-7)<4(2x-3)+20$;

$15x-35<8x-12+20$; $15x-8x<8+35$; $7x<43$; $x<\frac{43}{7}$; $x<6\frac{1}{7}$;

x=1; 2; 3; 4; 5; 6.

3. $y=x^2-4x+3$ funksiyaning grafigini yasang va x ning funksiya qiymatlari manfiy bo’ladigan qiymatlarini toping.



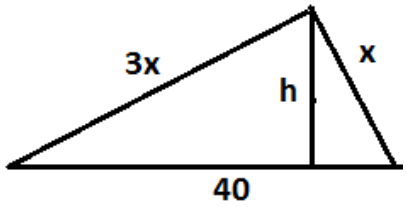
$x^2-4x+3=(x-2)^2-1$; $y=(x-2)^2-1$ funksiya grafigi $y=x^2$ funksiya grafigini x o’qi bo’ylab 2 birlik o’ngga, y o’qi bo’ylab 1 birlik pastga siljitishdan hosil bo’ladi. Funksiya grafigidan ko’rinadiki: $1<x<3$ oraliqda funksiya qiymatlari manfiy bo’ladi.

4. Parallelogramm yuzini formulasini keltirib chiqaring.

Paralelogramning yuzi asosi bilan balandligining ko`paytmasiga teng: S=a·h.

FORMULA ISBOTI: Paralelogramning BD dioganalini o`tkazamiz. U paralelogramning asoslari a va balandliklari h gat eng bo`lgan ikkita ABD va BCD uchburchakka ajratamiz. Bu uchburchaklarning yuzlari o`zaro teng, ya`ni: $S_{ABD}=S_{BCD}=0{,}5a\cdot h$. Paralelogramning S yuzi esa bu uchburchaklar yuzlarining yig`indisiga teng: $S=S_{ABD}+S_{BCD}=0{,}5a\cdot h+0{,}5a\cdot h=ah$, ya`ni S=a·h. FORMULA ISBOTLANDI!

5. To‘g‘ri burchakli uchburchakning katetlari 1 : 3 kabi nisbatda. Agar gipotenuza uzunligi 40sm bo‘lsa, to‘g‘ri burchagi uchidan tushirilgan balandligini toping.



$(3x)^2+x^2=40^2$; $10x^2=1600$; $x^2=160$; $S=0,5\cdot 3x\cdot x=1,5x^2=$ $=1,5\cdot 160=240$; $S=0,5\cdot 40\cdot h=20\cdot h$; $20\cdot h=240$; $h=12$sm.

17 – bilet

1. Birinchi quvur bakni 10 minutda, ikkinchi quvur esa 15 minutda to‘ldiradi. Ikkala quvur birgalikda bakni necha minutda to‘ldiradi ?
Bir minutda birinchi quvur bakning 1/10 qismini, ikkinchi quvur esa 1/15 qismini to’ldiradi.
Ikkala quvur birgalikda bir minutda bakning: $\frac{1}{10}+\frac{1}{15}=\frac{3+2}{30}=\frac{5}{30}=\frac{1}{6}$ qismini to’ldiradi.
Demak ikkala quvur birgalikda bakni 6 minutda to’ldiradi.

2. $\frac{a^2+b^2-c^2+2ab}{a+b+c}$ ifodani soddalashtiring va qiymatini toping, bunda a=0,25; b=2/3; c=−0,5

$$\frac{a^2+b^2-c^2+2ab}{a+b+c}=\frac{(a+b)^2-c^2}{a+b+c}=\frac{(a+b-c)\,(a+b+c)}{a+b+c}=a+b-c=\frac{1}{4}+\frac{2}{3}+\frac{1}{2}=\frac{17}{12}=1\frac{5}{12};$$

3. Tengsizlikni yeching: $\frac{x^2-2x-3}{x^2+2x+3}<0;$ $\frac{(x-3)(x+1)}{x^2+2x+3}<0;$

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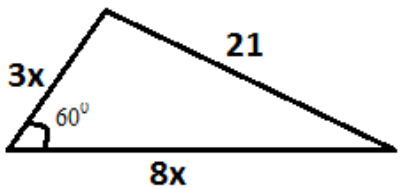
x^2+2x+3 ifoda x ning barcha qiymatlarida musbatligidan berilgan tengsizlik $(x-3)(x+1)<0$ tengsizlikka teng kuchli; $x \in (-1;\ 3)$;

4. Trapetsiya o‘rta chizig‘ini ta’riflang. Trapetsiya o‘rta chizig‘i xossasini isbotlang.
Trapetsiyaning o`rta chizig`I uning asoslariga parallel va uning uzunligi trapetsiya asoslari uzunliklari yig`indisining yarmiga teng.
TEOREMA ISBOTI: BCDN parallelogramdaqarama-qarshi tomonlar bo`lgani uchun BC=ND ΔABN da EP o`rta chiziq bo`ladi. Bundan EP||AN ekanini hosil qilamiz. Uchburchak o`rta chizig`i xossasiga ko`ra EP= ½ AN. Ammo AN=AD-ND=AD-BC. Trapetsiyaning o`rta chizig`i EF=EP+DF yoki EF= ½ AN+PF, bu yerda AN=AD-BC va PF=BC ekanini nazarga olsak, $EF=AD/2-BC/2+BC=AD/2+BC/2$, demak $EF=AD/2+BC/2$ ekan. T EOREMA ISBOTLANDI!.

5. Uchburchakning bir tomoni 21sm, qolgan ikki tomoni uzunliklari 3 : 8 nisbatda bo‘lib 60° li burchak hosil qiladi. Uchburchak perimetrini toping.



Kosinuslar teoremasidan: $21^2=(3x)^2+(8x)^2-2\cdot 3x\cdot 8x\cdot\cos 60^0$; $21^2=9x^2+64x^2-48x^2\cdot 0,5$; $21^2=49x^2$; $7x=21$; $x=3$; $P=3x+8x+21=11x+21=33+21=54$sm.

18 – bilet

1. Bir brigada topshiriqni 9 kunda, ikkinchisi esa 12 kunda bajaradi. Birinchi brigada topshiriqni bajarish uchun 3 kun ishladi. Ikkinchi brigada esa ishni tamomladi. Topshiriq necha kunda balarilgan.

   Bir kunda birinchi brigada topshiriqning 1/9 qismini, ikkinchi brigada esa 1/12 qismini bajaradi. 1- brigada 3 kunda topshiriqning $\frac{1}{9}\cdot 3=\frac{1}{3}$ qismini bajaradi. Topshiriqning qolgan 2/3 qismini esa 2-brigada $\frac{2}{3}:\frac{1}{12}=\frac{2}{3}\cdot 12=8$ kunda bajaradi. Topshiriq 3+8=11 kunda bajarilgan.

2. Tenglamani yeching: $\frac{6x-37}{2(x-8)}-\frac{2(5x-39)}{3(x-8)}=\frac{7}{8}$

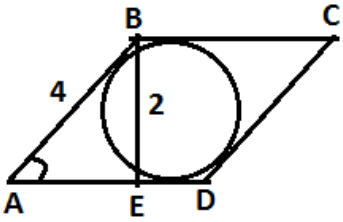
   Tenglamaning ikkala qismini 24(x−8) ga ko'paytiramiz, bunda x≠8;
   12(6x−37)−2·8(5x−39)=3·7(x−8); 72x−444−80x+624=21x−168; −29x=−168−180;
   29x=348; x=348:29; x=12;

3. $y=\sqrt{x^2-2x}+\sqrt{3-x}$ funksiyaning aniqlanish sohasini toping.

   $$\begin{cases}x^2-2x\ge 0\\ 3-x\ge 0\end{cases}\Rightarrow\begin{cases}x(x-2)\ge 0\\ x\le 3\end{cases}\Rightarrow\begin{cases}x\in(-\infty;\,0]\cup x\in(2:+\infty)\\ x\in(-\infty;\;3]\end{cases}\rightarrow\; x\in(-\infty;\,0]\cup(2;3];$$

4. Vertikal burchaklarni ta'riflang. Vertikal burchaklar xossasini isbotlang.
   Vertikal burchaklar deb, ikki to`g`ri chiziqning kesishishidan hosil bo`lgan va o`zaro qo`shni bo`lmagan burchaklar juftiga aytiladi.
   XOSSA: Vertikal burchaklar o`zaro teng.
   XOSSA ISBOTI: Aytaylik, 1∠ va 2∠ bo`lsin. 3∠=1∠ bo`lishini isbotlaymiz. ISBOTI: 180=2∠+1∠ °, chunki 1∠ va2∠ qo`shni burchaklardir. 3∠+2∠lar ham qo`shni burchaklardir. Bu ikki tenglikdan 3∠+ 2∠ = 2∠ +1∠, ya`ni 3∠=1∠ ekanligini hosil qilamiz. XOSSA ISBOTLANDI.

5. Rombning perimetri 16sm. Rombga ichki chizilgan aylananing radiusi 1sm. Rombning o'tmas burchagini toping.



   Rombning tomoni 16:4=4sm. BE balandligi h=2·r=2sm. ABE to'g'ri burchakli uchburchakdan: BAE burchak gipotenuza yarmiga teng katet qarshisidagi burchak. Bundan ∠BAE=30^0; Rombning o'tmas burchagi ∠ABC=180^0−∠BAE=$180^0-30^0=150^0$;
   Javob: 150^0;

19 – bilet

1. Proporsiyani yeching: $\left(5\frac{7}{18}-4\frac{23}{30}\right):\left(1{,}12\cdot 1\frac{1}{9}\right)=x:(3{,}2+0{,}8\cdot(5{,}5-3{,}25))$

   $\left(\frac{97}{18}-\frac{143}{30}\right):\left(1{,}12\cdot\frac{10}{9}\right)=x:(3{,}2+0{,}8\cdot 2{,}25);\quad \frac{56}{90}:\frac{11{,}2}{9}=x:(3{,}2+1{,}8);\quad \frac{56}{90}\cdot\frac{9}{11{,}2}=x:5;$ 0,5=x:5;

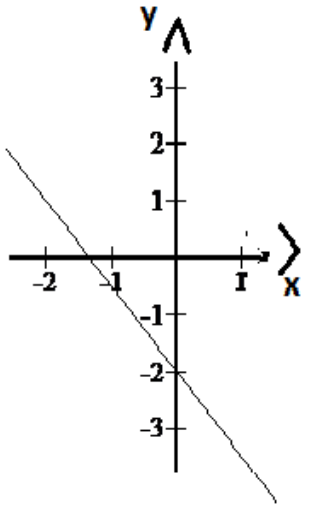
x=2,5;

2. Poyezd yo‘lda 12 minut ushlanib qoldi. So’ngra tezligini 15km/soat ga oshirib 60km masofada yo’qotilgan vaqtni qopladi. Poyezdning dastlabki tezligini toping

12 minut=1/5soat; Poyezdning tezligi v bo’lsin $\frac{60}{v}=\frac{60}{v+15}+\frac{1}{5}$; 60·5(v+15)=60·5·v+ +v·(v+15); 300v+4500=300v+v^2+15v; v^2+15v−4500=0; v_1=−75. chet ildiz; v_2=60. Javob: v=60km/soat.

3. y=−1,5x−2 funksiyaning grafigini yasab quyidagi savollarga lavob bering:

1) Aniqlanish va o‘zgarish sohasini ko‘rsating. 2) Ildizini toping.
3) Funksiyaning ishora o‘zgarmas oraliqlarini toping, ya’ni argumentning qanday qiymatlarida funksiya musbat va qanday qiymatlarida manfiy?
4) Funksiyaning o‘sish va kamayish oraliqlarini aniqlang.

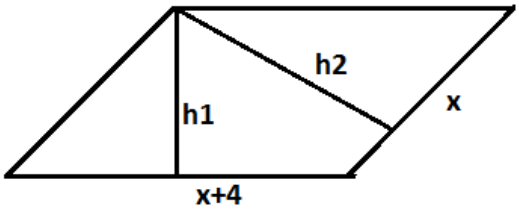


1) Aniqlanish sohasi: xϵ(−∞ ; +∞), o’zgarish sohasi: (−∞ ; +∞), 2) −1,5x−2=0; −1,5x=2; x=−4/3; 3) xϵ(−∞ ; −4/3) oraliqda funksiya musbat qiymatlar, xϵ(−4/3; +∞) oraliqda manfiy qiymatlar qabul qiladi. 4) funksiya xϵ(−∞ ; +∞) oraliqda kamayuvchi.

4. To‘g‘ri burchakli uchburchaklarning gipotenuza va katetiga ko‘ra tengligi haqidagi teoremani ta’riflang va isbotlang.

To`g`ri burchakli Δgipotenuzasining kvadrati uning katetlari kvadratlarining yig`indisiga teng.
TEOREMA ISBOTI:
Katetlari a va b, gipotenuzasi c bo`lgan to`g`ri burchakli ABC Δberilgan bo`lsin, u holda Pifagor teoremasi: $c^2=a^2+b^2$ formulasi bilan ifodalanadi, bunda a^2,b^2,c^2 –tomonlari a, b, c bo`lgan kvadratlarning yuzlariga teng. Shuning uchun bu tenglik tomoni gipotenuzaning uzunligiga teng kvadratning yuzi tomonlari katetlarga teng kvadratlarning yuzlari yig`indisiga teng ekanini ko`rsatadi. TEOREMA ISBOTLANDI!.

5. Parallelogrammning qo‘shni tomonlari ayirmasi 4 sm. O‘tmas burchagidan shu tomonlariga tushirilgan balandliklari 6 sm va 8 sm. Parallelogrammning perimetrini toping.



S=(x+4)·h1=(x+4)·6; S=x·h2=x·8; 8x=6(x+4); 8x=6x+24; 2x=24; x=12sm. P=2(x+x+4)=2(12+12+4)=2·28=56sm.

20 – bilet

1. Panjarani 5 ta bo’yoqchi 8 kunda bo’yab tugatadi. 10 ta boyoqchi shu panjarani necha kunda bo’yab tugatadi?

10 ta bo’yoqchi, 5 ta bo’yoqchidan 2 marta tez, ya’ni 4 kunda bo’yab tugatadi.

2. 8 ta ot va 15 ta sigir uchun kuniga 162 kg ozuqa ajratiladi. Agar 5 ta otga 7 ta sigirga qaraganda 3 kg ortiq ozuqa berishganligi ma'lum bo'lsa, har bir otga va har bir sigirga kuniga qanchadan ozuqa berishgan?

Bir kunda 1 ta otga n kg. 1 ta sigirga m kg. ozuqa berilsa: $\begin{cases} 8n+15n=162 & (5) \\ 5n-7m=3 & (8) \end{cases} \Rightarrow$

$\begin{cases} 40n+75n=810 \\ 40n-56m=24 \end{cases} \rightarrow$ 131m=786; m=786:131; m=6; 5n−7·6=3; 5n=45; n=9;

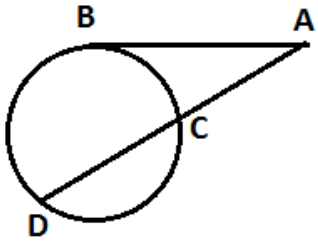
Javob: 9kg. va 6kg.

3. Amallarni bajaring: $\left(\frac{1}{2}\sqrt[3]{-27}+3\sqrt[4]{\frac{2}{27}}\right)+\left(3\sqrt[3]{\frac{1}{8}}-6\sqrt[4]{96}\right)=\frac{1}{2}\cdot(-3)+\sqrt[4]{81\cdot\frac{2}{27}}+3\cdot\frac{1}{2}-6\cdot\sqrt[4]{16\cdot 6}=$

$=\sqrt[4]{6}-6\cdot 2\cdot\sqrt[4]{6}=-11\sqrt[4]{6};$

4. Uchburchaklar tengligini ta'riflang. Uchburchaklar tengligining birorta alomatini isbotlang. Uchburchaklar tengligining TBT alomati. Agar bir uchburchakning ikki tomoni va ular orasidagi burchagi ikkinchi uchburchakning ikki tomoni va ular orasidagi burchagiga mos ravishda teng bo`lsa, bunday uchburchaklar o`zaro teng bo`ladi.
TEOREMA ISBOTI: ∠A=∠A_1 bo`lgani uchun, ABC uchburchakni $A_1B_1C_1$ uchburchakka shunday qo`yish mumkinki, unda A uch A_1 uchga, AB va AC tomonlar esa mos ravishda, A_1B_1 va A_1C_1 nurlar ustiga tushadi. AB=A_1B_1 va AC=A_1C_1 bo`lgani uchun, AB tomon A_1B_1 tomon bilan, AC tomon esa A_1C_1 tomon bilan ustma-ust tushadi. Xususan B nuqta B_1 nuqta bilan, C nuqta esa C_1 nuqta bilan ustma-ust tushadi.. Unda, B_1C_1 va BC tomonlar ham ustma-ust tushadi. Natijada, ABC uchburchakning uchta uchi, $A_1B_1C_1$ uchburchakning uchta uchi bilan, mos ravishda ustma-ust tushdi. Demak, ABC va $A_1B_1C_1$ uchburchaklar o`zaro teng. TEOREMA ISBOTLANDI!.

5. Aylana tashqarisidagi nuqtadan uzunliklarining yig'indisi 84 sm bo'lgan kesuvchi va urinma o'tkazilgan. Kesuvchining tashqi qismi urinmadan 9 sm qisqa. Urinmaning uzunligini hisoblang.



$\begin{cases} AB+AD=84 \\ AB-AC=9 \end{cases} \Rightarrow \begin{cases} AD=84-AB \\ AC=AB-9 \end{cases} \rightarrow$ AB^2=AD·AC=(84−AB)(AB−9);

AB^2=84AB−756−AB^2+9AB; 2AB^2−93AB+576=0; 1) AB=36sm; 2) AB=10,5sm.

Javob: 36sm yoki 10,5sm.

21 – bilet

1. Ifodaning son qiymatini toping: $\frac{(3k+1)2k}{k-l}+\frac{1}{3}$ *bunda* $k=\frac{1}{3}; l=0{,}1$

$$\frac{\left(3\cdot\frac{1}{3}+1\right)2\cdot\frac{1}{3}}{\frac{1}{3}-\frac{1}{10}}+\frac{1}{3}=\frac{2\cdot\frac{2}{3}}{\frac{10-3}{30}}+\frac{1}{3}=\frac{\frac{4}{3}}{\frac{7}{30}}+\frac{1}{3}=\frac{4}{3}\cdot\frac{30}{7}+\frac{1}{3}=\frac{40}{7}+\frac{1}{3}=\frac{120+7}{21}=\frac{127}{21}=6\frac{1}{21};$$

2. Yo'lovchilar poyezdi parovoz va 15 ta vagondan tarkib topgan va og'irligi 370,5 t, bunda parovozning og'irligi 4 ta vagon og'irligidan 13,3 t ortiq. Parovozning va bitta vagonning og'irligini toping.

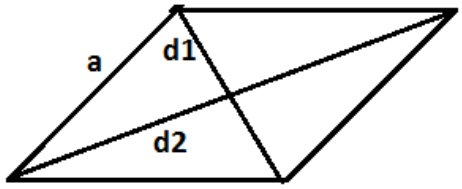
$\begin{cases} p+15v=370,5 \\ p-4v=13,3 \end{cases} \rightarrow$ 19v=357,2; v=357,2:19; v=18,8; p−4·18,8=13,3; p=75,2+13,3;

p=88,5t; Javob: 88,5t. va 18,8t;

3. Tengsizlikni yeching: $\frac{x^2-6x+5}{x^2+1}<0$ $\frac{(x-1)(x-5)}{x^2+1}<0$; x^2+1 ifoda x ning barcha qiymatlarida musbatligidan berilgan tengsizlik (x−1) (x−5)<0 tengsizlikka teng kuchli; x ϵ (1; 5);

4. Aylana uzunligi formulasini keltirib chiqaring.
Aylana uzunligining aylana diametriga nisbati aylana radiusiga bog`liq emas, ya`ni har qanday aylana uchun bu nisbat o`zgarmas sondir.
FORMULASI KELIB CHIQISHI: Ikkita aylana olamiz. Ularni radiuslari R_1 va R_2 uzunliklari esa mos ravishda C_1 va C_2 bo`lsin. $C_1/2R_1 = C_2/2R_2$ tenglikni isbotlashimiz kerak. Har ikki aylanaga ichki muntazam n-burchakni chizamiz. Ularning perimetrlarini mos ravishda $P_1$ va $P_2$ deb belgilaylik. Unda, $P_1=n\cdot 2R_1\sin 180°/n$ , $P_2=n\cdot 2R_2 \sin 180°/ n$ bo`lgani uchun $P_1/P_2=2R_1/2R_2$ bo`ladi. Bu tenglik istalgan n uchun to`g`ri n soni kattalashib borsa, berilgan aylanaga ichki chizilgan n-burchak perimetri $P_1$ shu aylana uzunligi $C_1$ga yaqinlashib boradi. Shuning uchun $P_1/P_2$ nisbat $C_1/C_2$nisbatga teng bo`ladi. Shunday qilib, tenglikdan $C_1/C_2=2R_1/2R_2$, bundan esa $C_1:2R_1= C_2:2R_2$ tenglik kelib chiqadi.
Shunday qilib, C/2R =π. Bu tenglikdan radiusi R ga teng aylana uzunligi uchun C=2πR formulani hosil qilamiz.
FORMULA KELIB CHIQDI!

5. Romb diagonallari 3 : 4 nisbatda bo'lib, yuzi 384sm^2 ga teng bo'lsa, uning perimetrini toping.



$d_1=3d$; $d_2=4d$; $S=0,5\cdot 3d\cdot 4d$; $384=6d^2$; $d^2=384:6=64$; $d=8$; $d_1=3\cdot 8=24$; $d_2=4\cdot 8=32$;
$a^2=(0,5\cdot d_1)^2+(0,5\cdot d_2)^2=12^2+16^2=144+256=400$; a=20sm.

P=4a=4·20=80sm.

22 – bilet

1. Ifodaning son qiymatini toping $\frac{3a^2-2ab-4b^2}{2a^2b^2-1}$ *bunda* $a=-\frac{2}{3}$; $b=1\frac{1}{2}$;

$$\frac{3a^2-2ab-4b^2}{2a^2b^2-1}=\frac{3\cdot\left(-\frac{2}{3}\right)^2-2\left(-\frac{2}{3}\right)\cdot\frac{3}{2}-4\cdot\left(\frac{3}{2}\right)^2}{2\cdot\left(-\frac{2}{3}\right)^2\cdot\left(\frac{3}{2}\right)^2-1}=\frac{\frac{4}{3}+2-9}{2-1}=3\frac{1}{3}-9=-5\frac{2}{3};$$

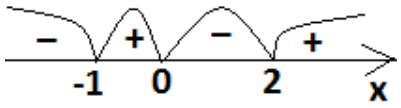
2. Ikki usta ish uchun 1170000 so'm ish haqi oldilar. Birinchi usta 15 kun, ikkinchisi 14 kun ishladi. Agar birinchi usta 4 kun uchun ikkinchu usta 3 kun uchun olgan ish haqidan 110000 so'm ortiq olgan bo'lsa, ularning har biri kuniga qanchadan maosh olgan ?

Ustalarning 1 kunlik ish haqlari n va m so'm bo'lsin: $\begin{cases}15n+14m=1170000 & (3)\\ 4n-3m=110000 & (14)\end{cases}\Rightarrow$

$\begin{cases}45n+42m=3510000\\ 56n-42m=1540000\end{cases}\rightarrow$ 101n=5050000; n=50000; 3m=4n−110000=4·50000−110000=

=200000−110000=90000; m=30000; Javob: 50000so'm va 30000so'm;

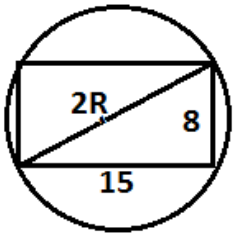
3. Tengsizlikni yeching: $\frac{x^2-x-2}{x}\ge 0;$ $\frac{(x-2)(x+1)}{x}\ge 0;$



x·(x−2)·(x+1)≥0; xϵ [−1; 0) U [2; +∞);

4. Uchburchakka tashqi chizilgan aylana markazi haqidagi teoremani ta'riflang va isbotlang.
Har qanday uchburchakka tashqi aylana chizish mumkin va faqat bitta.
TEOREMA ISBOTI: Δ ABC berilgan bo`lsin. Uning AB va BC tomonlariga p va q o`rta perpendikularlar o`tkazamiz. Ular biror O nuqtada kesishadi (kesishuvchi to`g`ri chiziqlarga perpendikular to`g`ri chiziqlar kesishadi). O ∈p bo`lgani uchun, OA=OB bo`ladi, shuningdek, O ϵ q bo'lgani uchun, OB=OC bo`ladi. Shuning uchun OA=OC, ya`ni AC tomonning o`rta perpendikulari ham O nuqtadan o`tadi. Shunday qilib, O nuqta ABC uchburchakning uchala uchidan teng uzoqlashgan bo`ladi: OA=OB=OC. Demak, ABC uchburchakka markazi O nuqtada va R=OA bo`lgan tashqi aylana chizish mumkin. O`rta perpendikularlar yolg`iz bitta nuqtada kesishgani uchun, bundan boshqa tashqi chizilgan aylana bo`lishi mumkin emas. TEOREMA ISBOTLANDI.

5. To'g'ri to'rtburchakning tomonlari 15m va 8m. Shu to'g'ri to'rtburchakka tashqi chizilgan doira yuzini toping.



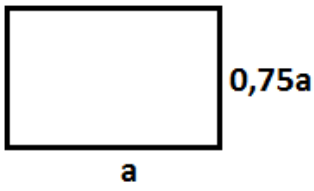
$(2R)^2=15^2+8^2=225+64=289;$ 2R=17; R=8,5m; $S=\pi R^2=8{,}5^2\pi=72{,}25\pi m^2;$

23 – bilet

1. Tenglamani yeching: $20x+0{,}4\cdot\left(-6\frac{1}{4}\right)=4\frac{2}{3}:\left(-\frac{1}{4}\right);$ $20x+0{,}4\cdot\left(-\frac{25}{4}\right)=\frac{14}{3}\cdot(-4);$

$$20x-\frac{5}{2}=-\frac{56}{3};\quad 20x=\frac{5}{2}-\frac{56}{3};\quad 20x=-\frac{97}{6};\quad x=-\frac{97}{120};$$

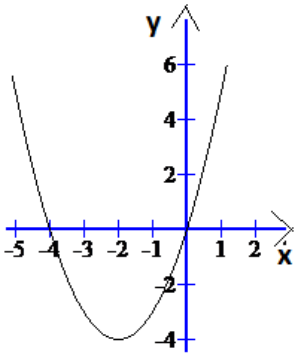
2. To'g'ri to'rtburchakning balandligi asosining 75 % ini tashkil qiladi. To'g'ri to'rtburchakning yuzi 48m² ga tengligi ma'lum bo'lsa, uning perimetrini toping.



$S=0{,}75a\cdot a=0{,}75a^2=48;$ $a^2=48:0{,}75;$ $a^2=64;$ a=8; 0,75a=6;

P=2(6+8)=2·14=28m.

3. $y=x^2+4x$ funksiyaning grafigini yasang va x ning qanday qiymatlarida funksiya o‘sishini aniqlang.



$x^2+4x=(x+2)^2-4$; $y=(x+2)^2-4$; Bu funksiya grafigi $y=x^2$ funksiya grafigini x o’qi bo’ylab chapga 2 birlik, y o’qi bo’ylab pastga 4 birlik siljitish bilan hosil qilinadi.

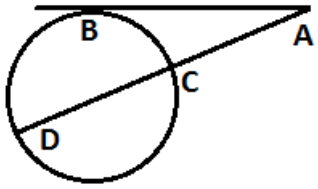
funksiya $x\geq -2$ da o’sadi.

4. Parallel to‘g‘ri chiziqlar ta’rifini keltiring. To‘g‘ri chiziqlar parallelik alomatlaridan birini isbotlang.

Agar ikki to’g’ri chiziq va kesuvchi hosil qilgan almashinuvchi burchaklar teng bo’lsa, u holda bu ikki to’g’ri chiziq parallel bo’ladi.

TEOREMA ISBOTI: 1) Oldin 1∠ va2∠ to`g`ri burchak bo`lgan holni qaraymiz: bu holda AB to`g`ri chiziq a va b to`g`ri chiziqlarga perpemdikular bo`ladi. Unda a va b to`g`ri chiziqlar bir to`g`ri chiziqqa perpendicular bo`lgan ikki to`g`ri chiziq haqidagi teoremaga asosan o`zaro parallel bo`ladi. TEOREMA ISBOTLANDI!

5. Doira tashqarisida olingan nuqtadan uzunligi 24sm bo‘lgan urinma va uzunligi 32sm bo‘lgan eng katta kesuvchi o‘tkazilgan. Doira yuzini toping.



$AB^2=AC\cdot AD$; $AC=AB^2:AD=24^2:32=18$sm. $DC=AD-AC=32-18=$ =14sm. AD eng katta kesuvchiligidan: DC- doira diametri bo’ladi.

$$S_d=\pi\cdot DC^2:4=\pi\cdot 14^2:4=49\cdot\pi sm^2;$$

24 – bilet

1. Eng kichigi 2n ga teng , uchta ketma – ket natural sonning yig‘ndisini toping.

$2n+(2n+1)+(2n+2)=2n+2n+1+2n+2=6n+3$;

2. Tenglamalar sistemasini yeching: $\begin{cases}7x-3y+1=0 & (5)\\ 4x-5y+17=0 & (3)\end{cases}\Rightarrow\begin{cases}35x-15y+5=0\\ 12x-15y+51=0\end{cases}\rightarrow$ $23x-46=0$;

$23x=46$; $x=2$; $4\cdot 2-5y+17=0$; $5y=8+17$; $5y=25$; $y=5$; Javob: (2; 5);

3. Ifodani soddalashtiring $(a^{-0,5}-1)(a-2a^{0,5}+1)^{-0,5}$ va uning a=0,16 bo‘lgandagi qiymatini toping.

$$(a^{-0,5}-1)\left(a-2a^{0,5}+1\right)^{-0,5}=(a^{-0,5}-1)\left((a^{0,5}-1)^2\right)^{-0,5}=\frac{a^{-0,5}-1}{a^{0,5}-1}=\frac{\frac{1}{a^{0,5}}-1}{a^{0,5}-1}=\frac{1-a^{0,5}}{a^{0,5}(a^{0,5}-1)}=-\frac{1}{a^{0,5}}=$$

$$-\frac{1}{0{,}16^{0,5}}=-\frac{1}{0{,}4}=-2{,}5;$$

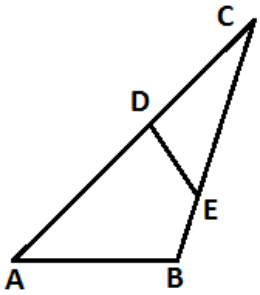
4. Uchburchakka ichki chizilgan aylana markazi haqidagi teoremani ta’riflang va isbotlang.

Har qanday uchburchakka ichki aylana chizish mumkin va faqat bitta.

TEOREMA ISBOTI: ΔABC berilgan bo`lsin. Bu uchburchakka ichki chizilgan aylananing markazi AB,AC va BC tomonlardan teng uzoqlikdagi nuqta bo`lishi ravshan. Burchak bissektrisasining har bir nuqtasi , uning tomonlaridan teng uzoqlikda yotishini bilasiz. Shuning uchun ichki chizilgan aylananing markazi Δbissektrisalarining kesishish nuqtasida

bo`ladi; markazdan tomonlarning bittasiga tushurilgan perpendikular , masalan, OD aylananing radiusi bo`ladi (OD=r). Bissektrisalar yolg`iz bitta nuqtada kesishgani uchun, bundan boshqa ichki chizilgan aylana bo`lishi mumkin emas. TEOREMA ISBOTLANDI!.

5. ABC uchburchakda AB=9sm. BC=15sm. va AC=18sm. AC tomonda olingan D nuqtadan DE to‘g‘ri chiziq (E nuqta BC tomonda yotadi) shunday o‘tkazilganki, bunda ∠DEC=∠A. Agar DE=6sm. bo‘lsa, DC va EC ni toping.



Δ ABC va Δ EDC lar o’xshash; $\frac{BC}{CD}=\frac{AC}{CE}=\frac{AB}{DE}=\frac{9}{6}=1{,}5;$

CD=BC:1,5=15:1,5=10sm. CE=AC:1,5=18:1,5=12sm.

Javob: 10sm. va 12sm.

25 – bilet

1. Amallarni bajaring: $1\frac{3}{5}:0{,}8+\left(-1\frac{1}{2}\right)^3\cdot 0{,}8=\frac{8}{5}:0{,}8+\left(-1\frac{3}{2}\right)^3\cdot 0{,}8=2-\frac{27}{8}\cdot 0{,}8=2-2{,}7=-0{,}7;$

2. Tengsizliklar sistemasining butun yechimlarini toping $\begin{cases}2-\frac{x}{2}>\frac{x}{3}+\frac{1}{3}\\ 1-x<\frac{1+x}{3}+x\end{cases}\Rightarrow$

22

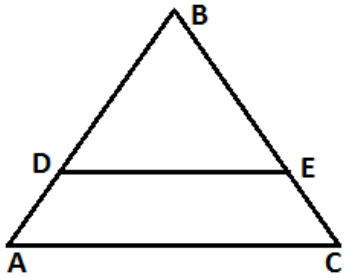
$\begin{cases}12-3x>2x+2\\ 3-3x<1+x+3x\end{cases}\Rightarrow\begin{cases}5x<10\\ 7x>2\end{cases}\Rightarrow\begin{cases}x<2\\ x>\frac{2}{7}\end{cases}\rightarrow$ x=1;

3. Ikki ovchi har biri kamondan 39 tadan o‘q uzdi. Otilgan o‘qlarning 44 tasi nishonga tekkan, qolganlari tegmagan. Agar ikkinchi ovchiga nisbatan birinchi ovchining nishonga tekkan o‘qlari soni nishonga tegmaganidan ikki marta ko‘pligi ma’lum bo‘lsa, ikkinchi ovchi necha marta nishonga tekkan ?

2-ovchining nishonga tegmagan o’qlari sonini n deb olsak, 1-ovchining nishonga tekkan o’qlari soni 2n bo’ladi. Demak 1-ovchi 2n marta, 2-ovchi 39−n marta nishonga tekkizishgan. 2n+(39−n)=44; 2n−n+39=44; n+39=44; n=5; 2-ovchi 5 ta o’qni nishonga tekkiza olmagan, qolgan 39−5=34 tasini nishonga tekkizgan. Javob: 34 ta.

4. Parallelogramm qarama - qarshi burchaklari va qarama - qarshi tomonlarining xossasi haqidagi teoremani isbotlang.
Parallelogramning qarama-qarshi tomonlar tengligining ISBOTI: ABCD parallelogram yasaymiz. Parallelogramning o`rtasidan diagonal o`tkazamiz. Diagonal parallelogramni ikkita uchburchakka ajratadi. BTB ga ko`ra uchburchaklar teng. Bunda BC va AD tomonlar parallel bo`ladi. Parallelogramning ichki almashinuvchi burchaklariga ko`ra, burchak 1 burchak 3 bilan, burchak 2 burchak 4 bilan ichki almashinuvchi burchak. Shunga ko`ra, parallelogramning qarama-qarshi tomonlari tengligi ISBOTLANDI!

5. Asosi AC=20sm. va yon tomoni AB=17sm. bo‘lgan ABC uchburchakda yon tomonidan AD=5,1sm. kesma ajratuvchi AC tomoniga parallel DE kesma alratilgan. DE ning uzinligini toping.



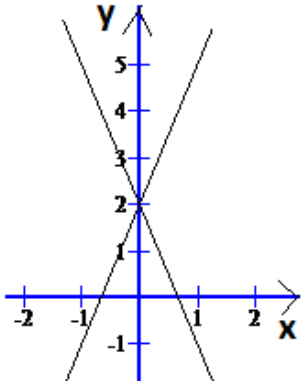
Δ ABC va Δ DBE lar o’xshash; $\frac{DB}{AB}=\frac{DE}{AC}$; $DE=AC\cdot\frac{DB}{AB}=$

$=20\cdot\frac{17-5,1}{17}=20\cdot\frac{11,9}{17}=14sm.$

26 – bilet

1. Amallarni bajaring: $\frac{1,8^2-0,6^2}{0,6\cdot4,8-4,8}=\frac{(1,8-0,6)\,(1,8+0,6)}{4,8(0,6-1)}=\frac{1,2\cdot2,4}{4,8(-0,4)}=-\frac{3}{2}=-1,5;$

2. y=3x+2 va y=−3x+2 funksiyalarning grafiklarini bitta koordinata tekisligida yasang. 1) Bu grafiklarning o‘xshashligi va farqi nimadaligini aniqlang. 2) x ortishi bilan y=3x+2 ning qiymati bir tekisda o‘sishini va y=−3x+2 ning qiymati esa bir tekisda kamayishini ko‘rsating.
1) Bu chiziqli funksiyalar grafiklari y o’qiga nisbatan simmetrik.
2) y=3x+2 chiziqli funksiya k=3>0 bo’lgani uchun o’suvchi, y=−3x+2 chiziqli funksiya k=−3<0 bo’lgani uchun kamayuvchi.

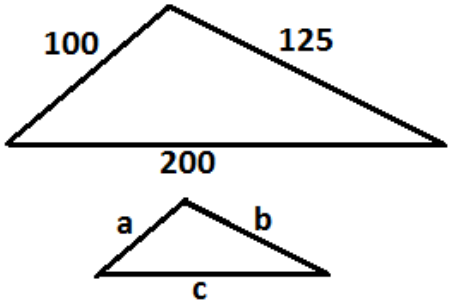


3. Hisoblang:

$(0,04)^{-1,5}\cdot0,125^{-\frac{1}{3}}-\left(\frac{1}{121}\right)^{-\frac{1}{2}}=\left(\frac{4}{100}\right)^{-\frac{3}{2}}\cdot\left(\frac{125}{1000}\right)^{-\frac{1}{3}}-121^{\frac{1}{2}}=\left(\frac{10}{2}\right)^{3}\cdot\frac{10}{5}-11=125\cdot2-11=239;$

4. Aylanaga ichki chizilgan burchakni ta’riflang. Ichki chizilgan burchak xossasi haqidagi teoremani isbotlang.
Aylanaga ichki chizilgan burchak o`zi tiralgan yoyning yarmi bilan o`lchanadi:
∠ABC=0,5 ($_{yoy}$)AC.
TEOREMA ISBOTI: ∠ABC- O markazli aylananing AC yoyiga tiralgan ichki chizilgan burchak bo`lsin. Aylana markazining shu ichki chizilgan burchakka nisbatan joylashishini ko`rib chiqamiz. Aylana markazi ichki chizilgan burchakning tomonlaridan biri,masalan, BC tomonda yotadi. OA radiusni o`tkazamiz va AOC markaziy burchakni qaraymiz. U BOA uchburchakning tashqi burchagidur. Δtashqi burchagining xossasiga ko`ra: burchak AOC= burchak OBA+OAB ammo, burchak OBA = burchak OAB chunki, AOB Δteng yonli(OA = OB= R). OBA va OAB burchaklar esa, teng yonli uchburchakning asosidagi burchaklardir. Demak, burchak AOC= 2burchak ABC. (1)Markaziy burchakning kattaligi shu burchakka mos yoyning burchak kattaligiga teng bo`lishini bilasiz. Bu holda AC yoy yarim aylanadan kichik shuning uchun, markaziy burchak xossasiga ko`ra, burchak AOC = yoy AC(2). (1) va (2) tengliklardan burchak ABC= ½ yoy AC. TEOREMA ISBOTLANDI!.

5. Uchburchakning tomonlari 1m, 2m va 125sm. Shu uchburchakka o‘xshash uchburchakning perimetri 85 sm. Ikkinchi uchburchakning tomonlarini aniqlang.



Bu uchburchaklar o’xshashligidan: $\frac{a}{100}=\frac{b}{125}=\frac{a}{200}=\frac{85}{425}=\frac{1}{5}$;

$a=\frac{1}{5}\cdot 100=20;\quad b=\frac{1}{5}\cdot 125=25;\quad c=\frac{1}{5}\cdot 200=40;$

Javob: 20sm,; 25sm.; 40sm.

27 – bilet

1. $\frac{\left(1\frac{1}{4}-1{,}4\right):0{,}2+0{,}75}{0{,}5:0{,}01-40}$ kasrning qiymati nolga tengligini isbotlang.

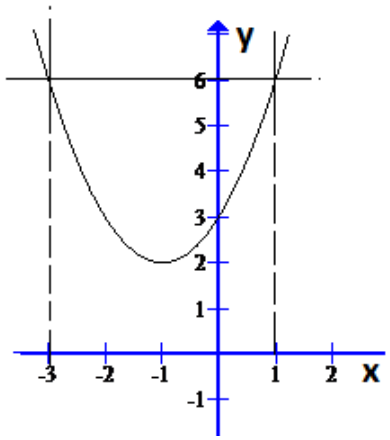
Kasr surati 0 ga teng bo’lib, maxraji 0 dan farqli bo’lsa, kasr qiymati 0 ga teng bo’ladi.

$$\frac{\left(1\frac{1}{4}-1{,}4\right):0{,}2+0{,}75}{0{,}5:0{,}01-40}=\frac{(1{,}25-1{,}4):0{,}2+0{,}75}{50-40}=\frac{-0{,}15\cdot 5+0{,}75}{10}=\frac{-0{,}75+0{,}75}{10}=\frac{0}{10}=0;$$

2. Tengsizlikni yeching: $2-\frac{5+x}{7}<1-\frac{9-x}{14}$ Tengsizlikning ikkala qismini 14 ga ko’paytirib:

$28-2(5+x)<14-(9-x);\quad 28-10-2x<14-9+x;\quad 3x>18-5;\quad 3x>13;\quad x>\frac{13}{3};\quad x>4\frac{1}{3};$

3. $y=x^2+2x+3$ funksiyaning grafigini yasang va grafikdan $y\geq 6$ bo‘ladigan x ning qiymatini toping.

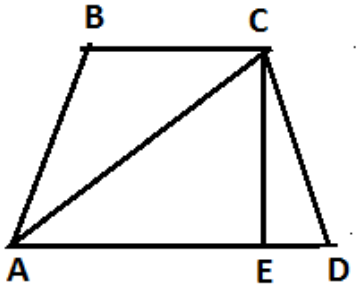


$x^2+2x+3=(x+1)^2+2$; $y=(x+1)^2+2$ funksiya grafigi $y=x^2$ funksiya grafigini x o’qi bo’ylab 1 birlik chapga, y o’qi bo’ylab 2 birlik yuqoriga siljitish bilan hosil qilinadi. $x^2+2x+3\geq 6$; Grafikdan $x\in(-\infty;-3]\cup[1;+\infty)$; da funksiya qiymatlari 6 dan katta ekanligi ko’rinadi.

4. 30° li burchak qarshisida yotuvchi katetning xossasini ta’riflang va isbotlang.

To`g`ri burchakli uchburchakning katetlaridan biri gipotenuzaning yarmiga teng bo`lsa, u katet 30^0 li burchak qarshisida yotadi.

TEOREMA ISBOTI:Haqiqatan, Δichki burchaklarining yig`indisi 180 ˚ga teng. To`g`ri burchakli uchburchakning bitta burchagi esa 90° ga teng. Shuning uchun, uning qolgan ikki burchaklari yig`indisi 90° ga teng bo`ladi. Biri 30° ga ikkinchisi 60° ga teng bo`ladi. TEOREMA ISBOTLANDI!.



5. Teng yonli trapetsiyaning asoslari 6sm va 10sm, diagonali esa 10sm. Trapetsiyaning yuzini toping.

Trapetsiya C uchidan CE balandlik tushiramiz. AE=(BC+AD):2= (6+10):2=16:2=8sm. ACE to'g'ri burchakli uchburchakdan: $CE^2=AC^2-AE^2=10^2-8^2=100-64=36$; CE=6sm.

$$S=\frac{BC+AD}{2}\cdot CE=\frac{6+10}{2}\cdot 6=8\cdot 6=48sm^2;$$

28 – bilet

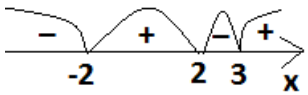
1. 2 % i $\dfrac{\left(\frac{3}{5}\cdot 0{,}12-0{,}66:30\right):0{,}01}{0{,}576^2+0{,}576\cdot 0{,}424+9{,}424}$ kasrning qiymatiga teng sonni toping.

$$\frac{\left(\frac{3}{5}\cdot 0{,}12-0{,}66:30\right):0{,}01}{0{,}576^2+0{,}576\cdot 0{,}424+9{,}424}=\frac{(0{,}072-0{,}022):0{,}01}{0{,}576(0{,}576+0{,}424)+9{,}424}=\frac{0{,}05:0{,}01}{0{,}576+9{,}424}=\frac{5}{10}=0{,}5;$$

$$\begin{vmatrix}0{,}5- & 2\%\\ x- & 100\%\end{vmatrix}\quad x=\frac{0{,}5\cdot 100}{2}=\frac{50}{2}=25;$$ Javob: 25

2. x_1 va x_2 sonlar $2x^2-11x+13=0$ tenglamaning ildizlari ekanligi ma'lum. $x_1^2+x_2^2$ ni hisoblang. Berilgan tenglama $x^2-5{,}5x+6{,}5=0$ keltirilgan tenglamaga teng kuchli. Viyet teoremasidan: $x_1+x_2=5{,}5$; $x_1\cdot x_2=6{,}5$; $x_1^2+x_2^2=(x_1+x_2)^2-2x_1\cdot x_2=5{,}5^2-2\cdot 6{,}5=30{,}25-13=17{,}25$;

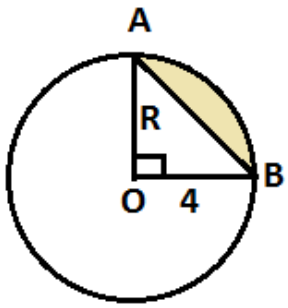
3. Tengsizlikni yeching: $\dfrac{x^2-5x+6}{x+2}>0;$ $\dfrac{(x-2)\,(x-3)}{x+2}>0;$



25

$(x-2)(x-3)(x+2)>0$; $x\in(-2;\ 2)\cup(3;\ +\infty)$;

4. Vatarga perpendikulyar diametr haqidagi teoremani ta'riflang va isbotlang.
Vatarga perpendicular diametr shu vatarni va unga tiralgan yoyni teng ikkiga bo`ladi.
TEOREMA ISBOTI: Markazi O nuqtada va radiusi R bo`lgan aylana berilgan AB-aylana vatari va CF vatarga perpendikular diametr bo`lsin. AP=PB va $(_{yoy})AD=(_{yoy})DB$ ekanini isbot qilishimiz kerak. Buning uchun OA va OB radiuslarni o`tkazamiz. Hosil bo`lgan AOB-teng yonli uchburchak, chunki OA=OB=R. Demak, OP-teng yonli uchburchak uchidan AB asosga tushirilgan balandlik. Shuningdek, u uchburchakning medianasi va bissektrisasi bo`ladi. OP-mediana bo`lgani uchun AP=PB. Uning bissektrisasi ekanidan ∠AOP=∠BOP ni hosil qilamiz. Bu burchaklar tiralgan yoylar bo`lgani uchun $(_{yoy})AD=(_{yoy})DB$. TEOREMA ISBOTLANDI!.



5. Radiusi 4 sm, yoyi esa 90° bo'lgan segmentning yuzini toping.

Yoyi 90^0 bo'lgan segment yuzini hisoblash formulasi:

$$S=\frac{\pi\cdot R^2}{360}\cdot 90-S_{\Delta AOB}=\frac{4^2\pi}{4}-\frac{1}{2}4\cdot 4=4\pi-8=4(\pi-2)\,sm^2;$$

29 – bilet

1. 10 % i $\dfrac{3}{5}\cdot 6{,}75-3\dfrac{17}{48}+\dfrac{5}{48}$ ifodaning qiymatiga teng sonni toping.

$\frac{3}{5}\cdot 6{,}75-3\frac{17}{48}+\frac{5}{48}=\frac{20{,}25}{5}-\frac{161}{48}+\frac{5}{48}=4{,}05-\frac{156}{48}=4{,}05-3{,}25=0{,}8;$ $\left|\begin{matrix}0{,}8-10\%\\ x-100\%\end{matrix}\right|$ $x=\frac{0{,}8\cdot 100}{10}=8;$

2. Tengsizliklar sistemasini yeching: $\begin{cases}x+12>-0{,}75\\ \frac{1{,}5x+2}{4}<\frac{2x+3}{2}\end{cases}$

$\begin{cases}x+12>-0{,}75\\ \frac{1{,}5x+2}{4}<\frac{2x+3}{2}\end{cases}\Rightarrow\begin{cases}x>-12-0{,}75\\ 1{,}5x+2<4x+6\end{cases}\Rightarrow\begin{cases}x>-12{,}75\\ 2{,}5x>-4\end{cases}\Rightarrow\begin{cases}x>-12{,}75\\ x>-1{,}6\end{cases}\rightarrow x>-1{,}6;\quad x\in(-1{,}6;+\infty);$

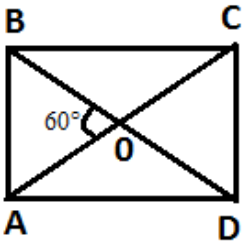
3. $\begin{cases}2x+5y=16\\ 7x-3y=15\end{cases}$ tenglamalar sistemasining yechimi $x^2+px+q=0$ tenglamaning ildizlari ekani ma'lum bo'lsa, p va q ni toping.

$\begin{cases}2x+5y=16\ \ (3)\\ 7x-3y=15\ \ (5)\end{cases}\Rightarrow\begin{cases}6x+15y=48\\ 35x-15y=45\end{cases}\rightarrow$ 41x=123; x=3; 2x+5y=16; 6+5y=16; 5y=10; y=2;

Viyet teoremasidan: p=−(3+2)=−5; q=3·2=6; $x^2-5x+6=0$;

4. Aylanaga o'tkazilgan urinmani ta'riflang . Urinmaning xossasini isbotlang .
Aylana bilan faqat bitta umumiy nuqtaga ega bo`lgan to`g`ri chiziq shu aylanaga urinma deyiladi.
TEOREMA: Aylanaga urinma shu aylananing urunish nuqtasiga o`tkazilgan radiusga perpendikular.
TEOREMA ISBOTI: *l* to`g`ri chiziq aylanaga A nuqtada o`tkazilgan urinma bo`lsin. R=OA ning *l* ga perpendicular bo`lishini isbot qilamiz. Shartga ko`ra, *l* to`g`ri chiziqning A nuqatasidan boshqa hamma nuqtalari aylanadan tashqarida yotadi. Shuning uchun bu to`g`ri chiziqning A dan boshqa har qanday A_1nuqtasi uchun $OA_1>OA$. Demak, OA masofa O nuqtadan *l* to`g`ri chiziqning nuqtalarigacha bo`lgan masofalarning eng qisqasidir. Nuqtadan to`g`ri chiziqqacha eng qisqa masofa esa shu to`g`ri chiziqqa tushirilgan perpendicular bo`ladi. Bundan, OA_|_*l* ekani kelib chiqadi. TEOREMA ISBOTLANDI!.

5. To'g'ri to'rtburchakning diagonallari 60° li burchak ostida kesishadi. Ikkala diagonali va ikkita kichik tomoni yig'indisi 3,6m. Har bir diagonali uzunligini aniqlang.



To'g'ri to'rtburchakning diagonallari kesishish nuqtasida teng 2 ga bo'linadi. ∠AOB=60^0 ligidan AOB uchburchak muntazam.
AB=AO=AC:2; 2AC+2AB=3,6; 2AC+AC=3,6; 3AC=3,6; AC=3,6:3; AC=1,2m
Javob: 1,2m.

30 – bilet

1. $\frac{6{,}2\cdot 5-4}{\left(\frac{1}{6}-1\frac{2}{3}\cdot 0{,}2\right):\frac{2}{3}+\frac{1}{4}}$ ifoda ma'noga ega emasligini isbotlang.

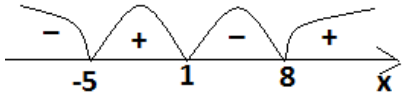
Kasr ifoda maxraji 0 ga teng bo'lganda ma'noga ega emas.

$\left(\frac{1}{6}-1\frac{2}{3}\cdot 0{,}2\right):\frac{2}{3}+\frac{1}{4}=\left(\frac{1}{6}-\frac{5}{3}\cdot\frac{2}{10}\right)\cdot\frac{3}{2}+\frac{1}{4}=\left(\frac{1}{6}-\frac{1}{3}\right)\cdot\frac{3}{2}+\frac{1}{4}=-\frac{1}{6}\cdot\frac{3}{2}+\frac{1}{4}=-\frac{1}{4}+\frac{1}{4}=0;$

2. Kasrni qisqartiring:

$$\frac{x^3-2x^2-16x+32}{x^2-6x+8}=\frac{x^2(x-2)-16(x-2)}{(x-2)\,(x-4)}=\frac{(x^2-16)(x-2)}{(x-2)\,(x-4)}=\frac{(x+4)(x-4)}{(x-4)}=x+4;$$

3. Tengsizlikni yeching: $\frac{(x^2+1)(x-8)}{(x+5)(x-1)}<0$ x^2+1 ifoda x ning barcha qiymatlarida musbat. Shuning uchun berilgan tengsizlik quyidagi tengsizlikka teng kuchli: $\frac{(x-8)}{(x+5)(x-1)}<0;$



(x−8)(x+5)(x−1)<0; xϵ(−∞; −5) U (1; 8);

4. To‘g‘ri burchakli uchburchakning to‘g‘ri burchagi uchidan gipotenuzaga tushirilgan balandlik haqidagi teoremani ta’riflang va isbotlang.

XOSSA: To`g`ri burchakli uchburchakning to`g`ri burchagi uchidan tushurilgan balandligi uni o`ziga o`xshash ikkita uchburchakka ajratadi.

TA`RIF: Agar a, b va c kesmalar uchun a:b=b:c bo`lsa, b kesma a va c kesmalar orasidagi o`rta proporsional kesma deb ataladi.

1-TEOREMA: To`g`ri burchakli uchburchakning to`g`ri burchagi uchidan tushurilgan balandlik katetlarning gipotenuzadagi proyeksiyalari orasida o`rta proporsional bo`ladi.

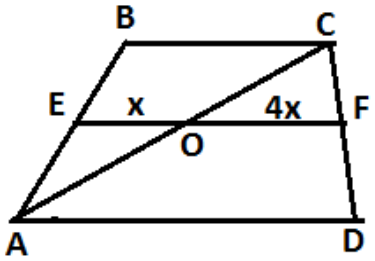
Haqiqatan ham, isbotlangan xossaga ko`ra, ΔACD o`xshash ΔCBD. Bundan,

$\frac{AD}{CD}=\frac{CD}{BD};\quad CD^2=AD\cdot BD;\quad CD=\sqrt{AD\cdot BD}$

2-TEOREMA: To`g`ri burchakli uchburchakning kateti gipotenuza bilan shu katetning gipotenuzadagi proyeksiyasi orasida o`rta proporsionaldir. Haqiqatan ham, isbotlangan xossaga ko`ra ΔABC o`xshash ΔACD. Bundan, $\frac{AB}{AC}=\frac{AC}{AD};\rightarrow AC^2=AB\cdot AD\quad AC=\sqrt{AB\cdot AD}$.

Xuddi shunga o`xshash $BC=\sqrt{BD\cdot AB}$ ekanligini isbotlash mumkin..

5. Trapetsiyaning uzunligi 20 sm ga teng o‘rta chizig‘i uning diagonali bilan ikki qismga bo‘lingan. Bu qismlardan biri ikkinchisining 25 % ini tashkil qiladi. Trapetsiya asoslarini toping.



4x+x=20; 5x=20; x=4; EO=4sm; OF=4·4=16sm. EO ABC uchburchakning o’rta chizig’i: BC=2·EO=2·4=8sm. OF ACD uchburchakning o’rta chizig’i: AD=2·OF=2·16=32sm

Javob: 8sm. va 32sm.