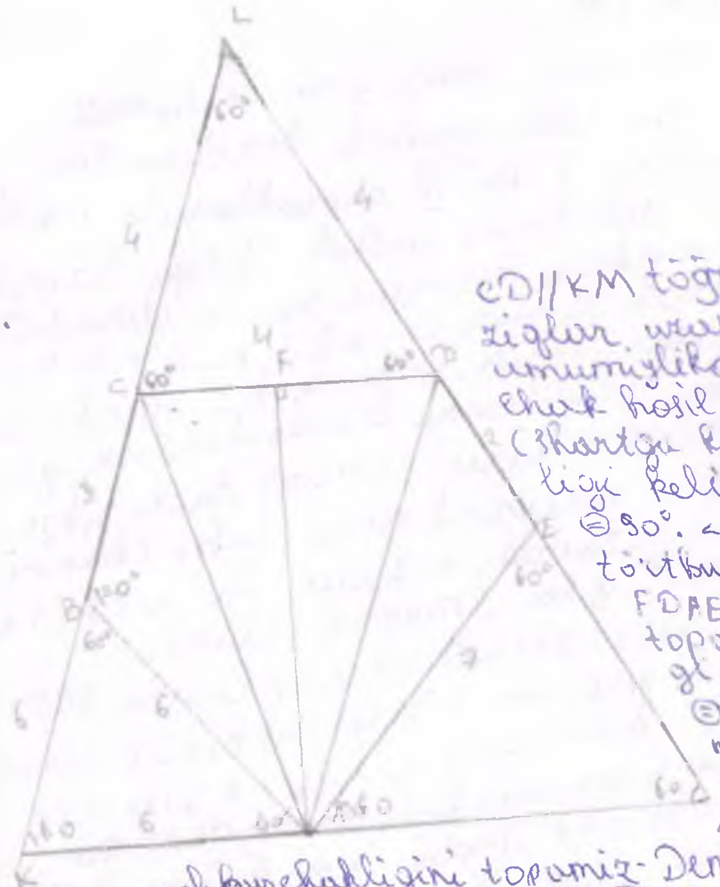
K9-sinf uchun masalalar

1.  — 5 ta uchburchak tasvirlangan

Yechilishi: Avvalo katta uchburchaklardan hisoblashni boshlaymiz. 2ta – katta uchburchak bor.
6 ta – muntazam 6 burchak tashqarisidagi uchburchaklar. Ularni har birida 8 ta – uchburchak joylashgan. Jami 54 ta.
Endi muntazam 6 burchak ichidagi burchaklarni hisoblaymiz. Ularni jami soni 120 ta – maydа, 12 ta ōrtacha. Va 6 ta katta uchburchaklardan tuzilgan.
Endi muntazam uchburchaklar tashqarisidagi ya'ni muntazam 6 burchak tashqarisidagi uchburchaklar bilan muntazam 6 burchak toshkil qilgan uchburchaklarni topamiz. Jami. 62 ta uchburchak.
Demak jami uchburchaklar soni $2+54+120+12+6+62=258$ ta uchburchak bor.

Javob: 258 ta.

2. 

CD//KM tōgri chiziq ōtkazildi. CB va DE tōgri chiziqlar uzaytirildi va L nuqtada kesishdi. Bundan umumiylikka zarar bermagan holda KLM uchburchak hosil qilindi. $\angle BCD=\angle CDE=\angle DEA=\angle ABC=120°$ (shartga kōra). Bundan $\angle LCD=\angle LDC=\angle KBA=\angle AEM=60°$ ligi kelib chiqadi. CD // KM bōlgani uchun $\angle KAF=\angle FAM=90°$. $\angle BCF+\angle CFA+\angle FAB+\angle ABC=360°$ (BCFA qavariq tōrtburchak). Bundan $\angle BAF=30°$. Xuddi shunday FDAE qavariq tōrtburchakdan $\angle FAE=30°$ ligini topamiz. $\angle KAB+\angle BAF=90°$. Bundan $\angle KAB=60°$ ligi kelib chiqadi. Xuddi shunday $\angle FAE+\angle EAM=90°$. Bundan $\angle EAM=60°$ boladi. Bundan kōrinib turibdiki ΔKBA, ΔAEM, ΔCLD muntazam uchburchaklar. Bulardan ΔKML ham muntazam uchburchakligini topamiz. Demak $KM=KL=LM=13$. Bundan $BC=3$; $DE=2$ ligi kelib chiqadi. $S_{\Delta KML}=\frac{169\sqrt{3}}{4}$ ($S=\frac{a^2\sqrt{3}}{4}$ muntazam uchburchakning yuzi).
$S_{\Delta KBA}=\frac{36\sqrt{3}}{4}$; $S_{\Delta AME}=\frac{49\sqrt{3}}{4}$; $S_{\Delta CLD}=\frac{16\sqrt{3}}{4}$. $S_{\Delta BCA}=3\cdot6\cdot\sin120°\cdot\frac{1}{2}=9\cdot\frac{\sqrt{3}}{2}=\frac{9\sqrt{3}}{2}$. $S_{\Delta ADE}=2\cdot7\cdot\sin120°\cdot\frac{1}{2}=\frac{7\sqrt{3}}{2}$. $S_{ACD}=S_{KLM}-S_{KBA}-S_{AEM}-S_{CLD}-S_{BCA}-S_{EDA}=\frac{36\sqrt{3}}{4}$ ga teng. Boshqa tomondan $S_{ACD}=\frac{CD\cdot AF}{2}=\frac{4\cdot AF}{2}=2AF$. Topilganlarni tenglashtirsak $2AF=\frac{36\sqrt{3}}{4}\Rightarrow AF=\frac{18\sqrt{3}}{4}$.

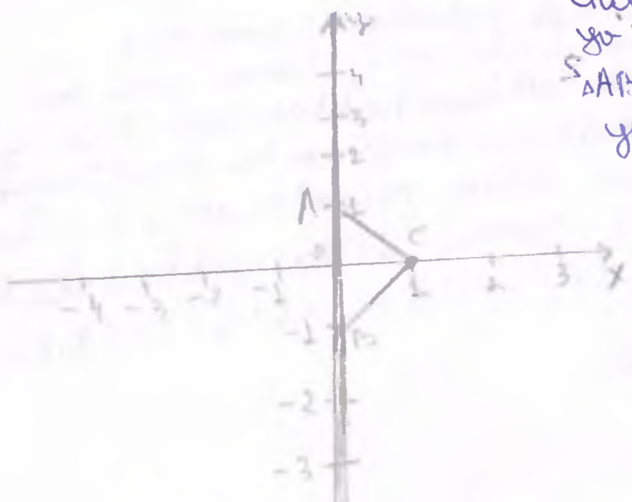
Demak $AF=\frac{18\sqrt{3}}{4}$ Javob: $\frac{18\sqrt{3}}{4}$

3. $(y+\sqrt{x})(y-x^2)\sqrt{1-x}\le 0$. Tenglik ya'ni qavslarni har birini nolga tenglaymiz.

$\sqrt{1-x}=0$ $y-x^2=0$ $y+\sqrt{x}=0$
$x=1$ $y=x^2$ $y=-\sqrt{x} \Rightarrow x\ge 0 \Rightarrow -1\le y\le 1$ kelib chiqadi.

Bu yerda x birdan boshqa butun son qabul qila olmaydi ya'ni musbat butun son $x\le 1$ bo'ladi. Chunki ildiz ostidagi son faqat ~~1~~ $-x\ge 0$ bo'ladi bundan $x\le 1$ kelib chiqadi

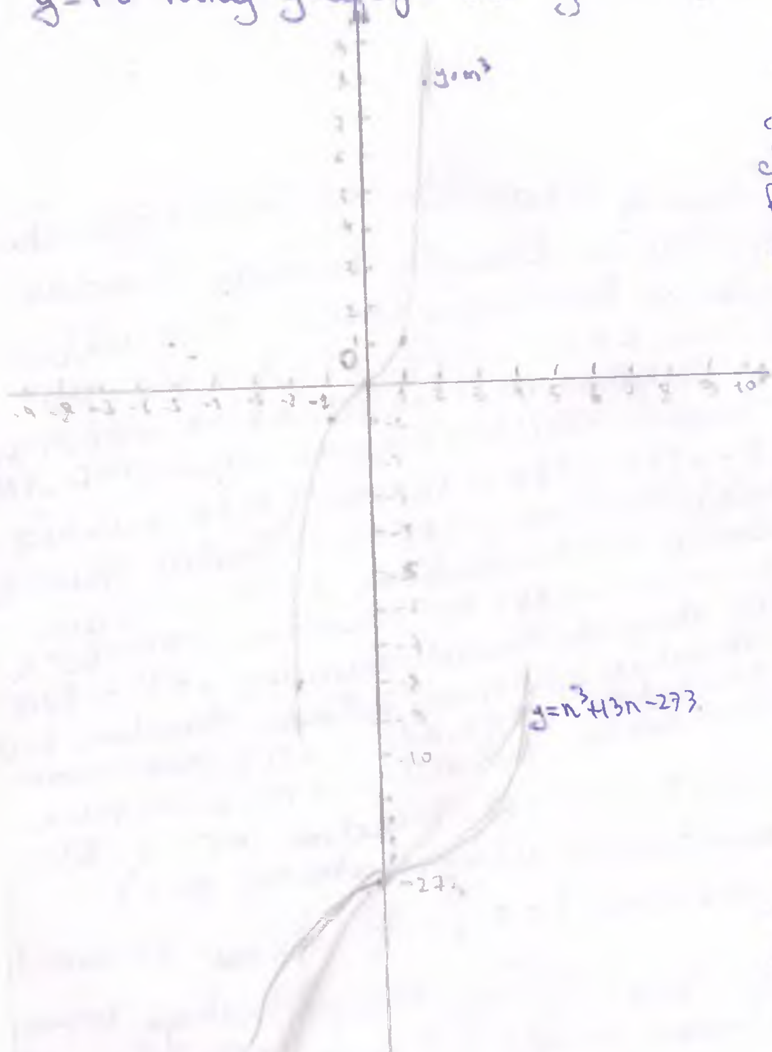
$x=1$ ligini hisobga olgan holda $y=\pm 1$ ligi kelib chiqadi. Topilganlarni kordinatalar tekisligiga joylashtiramiz.



Endi biz topishimiz kerak $A(0;1)$; $B(0;-1)$; $C(1;0)$ ya'ni $\triangle ABC$ ni yuzini topishimiz kerak.
$S_{\triangle ABC}=S_{OAC}+S_{OCB}=\frac{1}{2}+\frac{1}{2}=1$. Demak $\triangle ABC$ ni yuzi 1 ga teng

Javob: 1

5. $m^3=n^3+13n-273$. Bu yerda $n,m\in N$
$y=m^3$ ning grafigi va $y=n^3+13n-273$ ning grafigini chizamiz



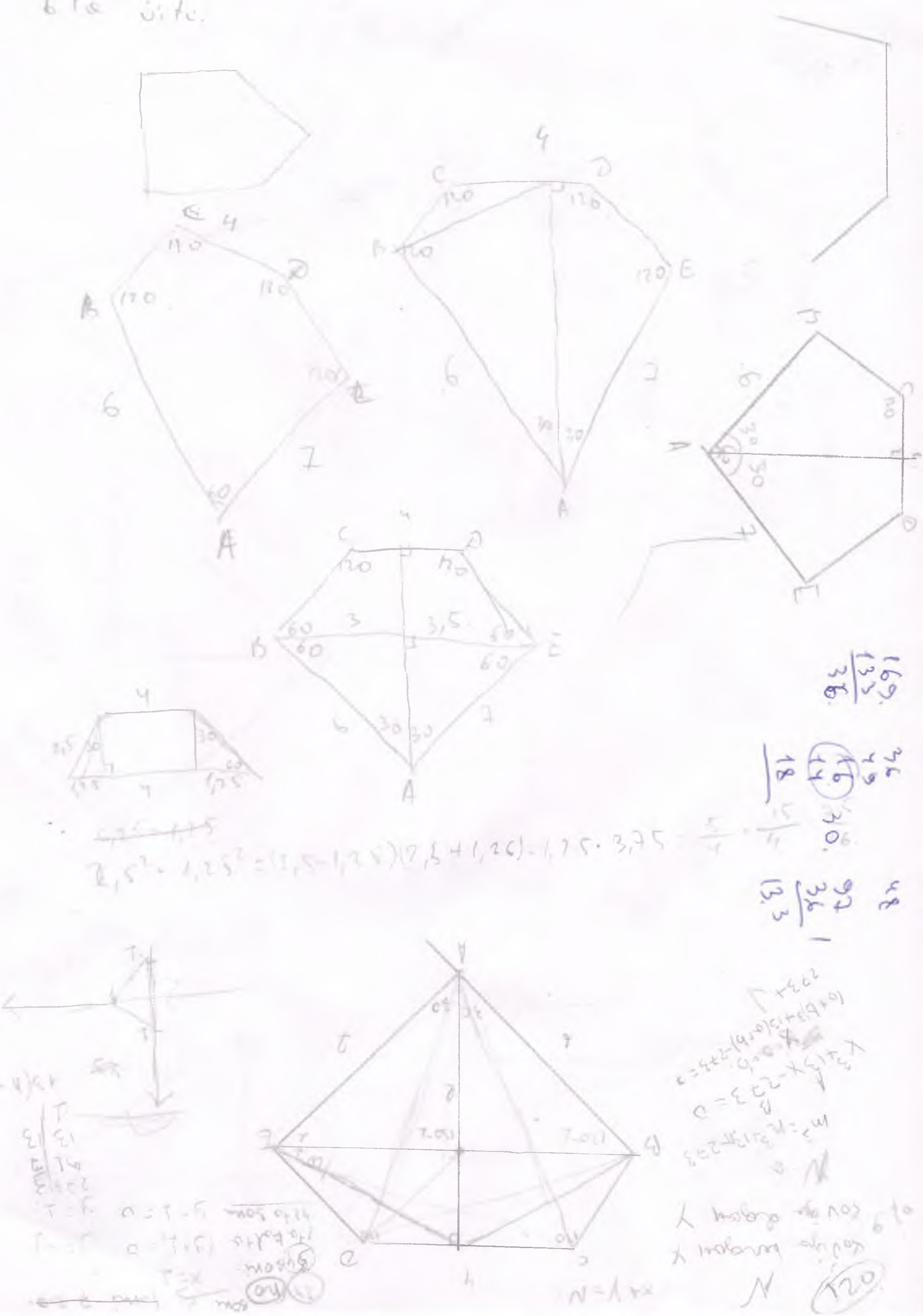
Bu ikki grafik kordinata o'qini I va III chorakларida kesishadi deb faraz qilsak. Bizga birinchi chorakda kesishadigan kordinatalar kerak bo'ladi chunki $m,n\in N$ bo'lgani uchun. Demak biz III chorakda grafiklarni kesishishini aniqlashimiz zarur emas. Endi $n^3+13n-273$ biror natural sonni kubi ekanini korsatamiz. $n=1$ da va $n=2,3,4,5$ ni qabul qila olmaymiz chunki $n^3+13n-273\ge 0 \Rightarrow n\ge 6$ ligini topamiz. $n=6$ da $n^3+13n-273$ biror sonni kubi bo'lmaydi. $n=7$ da $n^3+13n-273$ ham biror sonni kubi bo'lmaydi. $n=8$ da $n^3+13n-273$ ifoda 7 ni kubiga teng bo'lar ekan. Demak $m=7$; $n=8$ bo'lganda shart bajariladi. n bundan boshqa qiymat qabul qila olmaydi. Chunki ikki grafik I chorakda faqat 1 ta nuqtada kesishadi

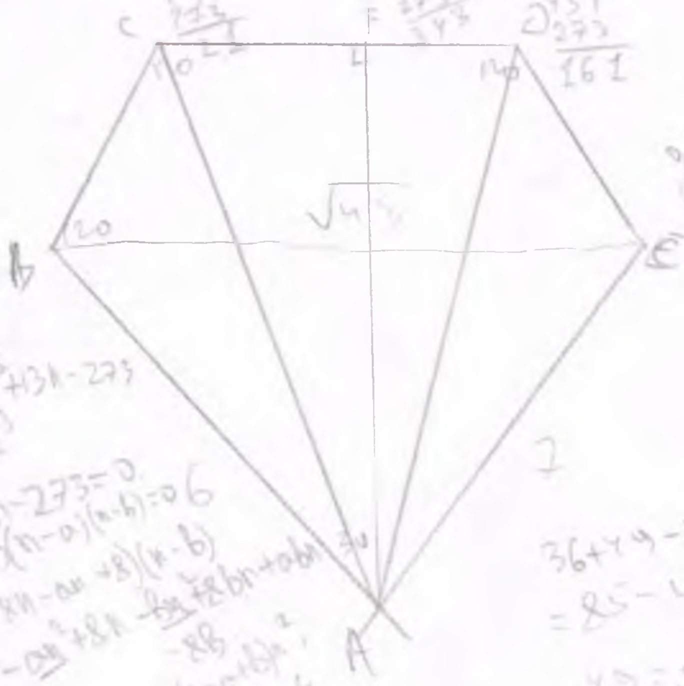
Chunki grafiklar orasidagi masofa uzayib boshqa kesishmaydi
Demak n=8. Agar n biror sonnikubi bölsa n son 2 böladi.
Javob: 2.

4. N – Bolalar soni
Sovġa bergan bolalar A ta $A+B=N$.
Sovġa olgan bolalar B ta
Har bir bola olgan sovġa x ta
$N>1$. Bu yerdan N – nechi bölganda bajarilishini topish uchun sovġa bergan bolalar soni A va sovġa olgan bolalar soni B özaro farq qilishi kerak chunki $A=B$ bölsa ayrim bolalar sovġa uloshadi lekin bir xilda sovġa uloshish bölib qoladi. Bu esa shartga köra zid. Demak endi orasida farq bölgan A va B sonlarni qidiramiz. $N \geq 5$ da örinli

9- sinf uchun masalalar

a ta kulta.
6 ta uita.





$m^3=n^3+13n-273$

$n^3+13n-273=0$

$(n-8)(n-a)(n-b)=0$

$36+49-2\cdot6\cdot7\cdot\cos60=$

$=85-42=\sqrt{43}$

$49=36+43$

$0,1,1^2$

$(3k+1)$

$(3k+2)$

$n^3+13n>273$ $(n\geq6)$

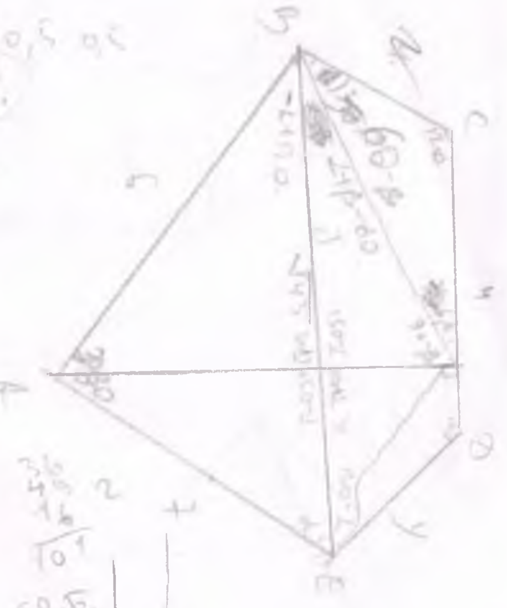
$\sqrt{0{,}5a\cdot0{,}5a\cdot0{,}5a\cdot1{,}5a}$

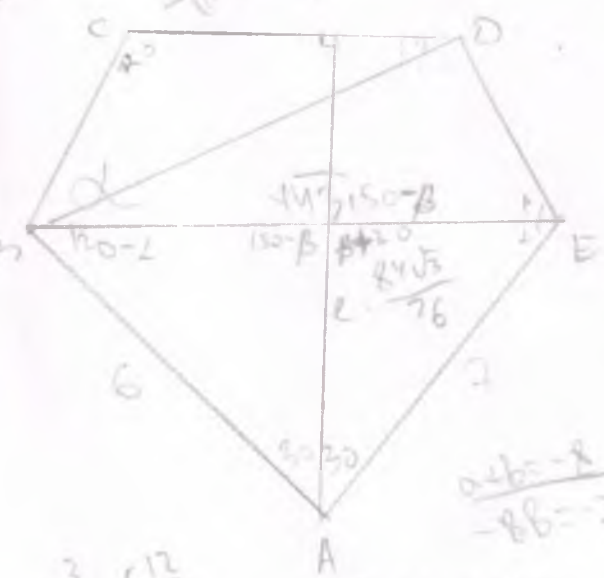
$\frac{\sqrt3}{4}a^2$

$\frac{36\sqrt3}{4}$

$\frac{49\sqrt3}{4}$

$\frac{16\sqrt3}{4}$





$\ell=\frac{84\cdot\frac{\sqrt3}{2}}{13}=\frac{84\sqrt3}{26}$

$\alpha+\beta=120$

$\cos\alpha\cos\beta-\sin\alpha\sin\beta=-\frac12$

$2\alpha+60=180$

$\left(\frac{84\sqrt3}{26}\right)^2=42-xy$

$xy=42-\left(\frac{84\sqrt3}{26}\right)^2$

$36=43+49-2\cdot7\cdot\sqrt{43}\cdot\cos\alpha$

$56=2\cdot7\sqrt{43}\cos\alpha$

$4=\sqrt{43}\cos\alpha$

$\cos\alpha=\frac{4}{\sqrt{43}}=\frac{4\sqrt{43}}{43}$

$\frac{16}{43}+\sin^2\alpha=1$

$\sin^2\alpha=\frac{27}{43}$

$\sin\alpha=\frac{3\sqrt3}{\sqrt{43}}$

$x+y=\sqrt{43}$

$a+b=-8$

$-8b=-273$

$n^3=512+13n$

$8+8b+8a=13$

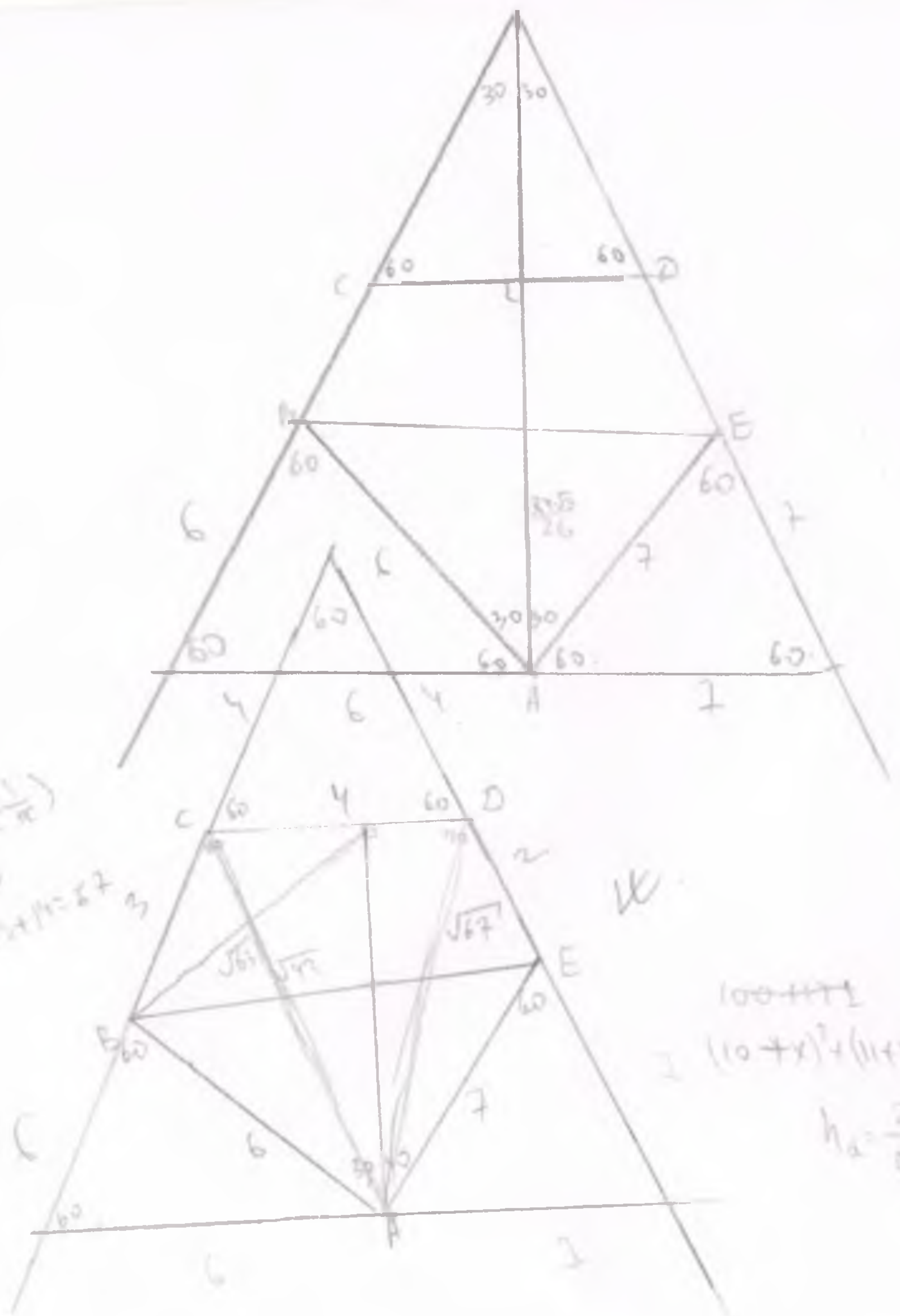
$\frac{52\sqrt3}{4}$

$7\cdot\frac{\sqrt3}{4}=\frac{20\sqrt3}{4}$

$\frac{5\sqrt3}{4}$

$3\cdot6\frac{\sqrt3}{4}\cdot\frac12=$

$90-\beta+120-\alpha+\alpha-\beta=180$



$9+36-2\cdot3\cdot6\left(-\frac{1}{2}\right)$

$45+18=63$

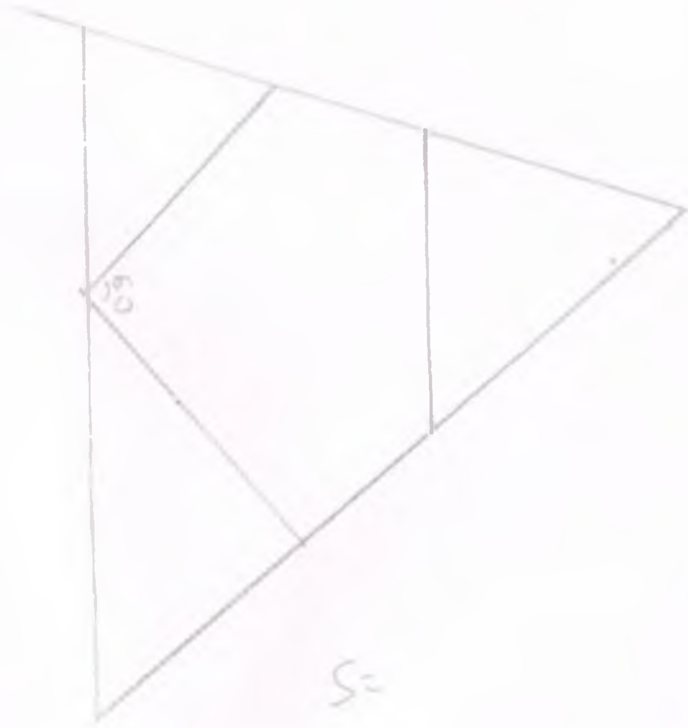
$7+49+14=53+14=67$

$100+11+1$

$(10+x)^2+(11+x)$

$h_a=\frac{2}{a}\sqrt{p(p-\ )}$

$S=ah_a$



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