K – 9 „Hamjihatlik formulasi"/ „Uchinchi mingyillik"

N1

Uchburchaklar soni:

1 → 120

2 → 116

3 → 104

4 → 90

5 → 72

6 → 56

7 → 42

8 → 30

9 → 20

10 → 12

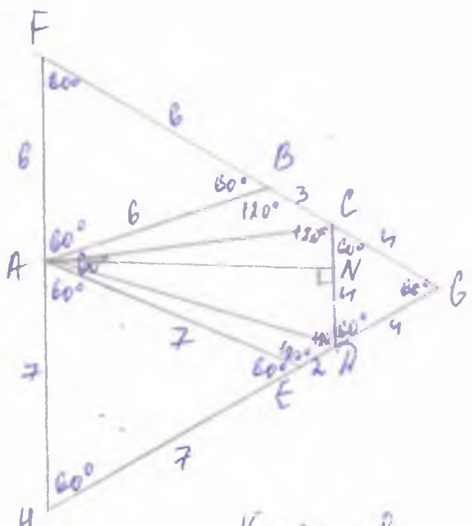
11 → 6

12 → 2

Hammasi bo'lib: $120+116+104+90+72+56+42+30+20+12+6+2 = 670.$

$\boxed{\text{Javob: } 670}$

N2



5-burchakning tomonlarini davom ettirsak $\Rightarrow \triangle FGH$ – teng tomonli bo'ladi.

$AF = FB = AB = 6$

$AH = AE = HE = 7$

$CG = GD = CD = 4$

$BC = 6+7-6-4 = 3$

$ED = 6+7-7-4 = 2$

Kosinuslar teoremasi orqali AD va AC-ni topamiz:

$$AD = \sqrt{AE^2 + ED^2 - 2AE\cdot ED\cdot \cos\angle AED} = \sqrt{49+4+2\cdot 7\cdot 2\cdot \tfrac{1}{2}} = \sqrt{67}$$

$$AC = \sqrt{36+9+2\cdot 6\cdot 3\cdot \tfrac{1}{2}} = \sqrt{63}$$

$AN \perp CD$

$$AN = \frac{2}{CD}\cdot\sqrt{p(p-AC)(p-CD)(p-AD)} = \frac{2}{4}\cdot\sqrt{\frac{\sqrt{67}+\sqrt{63}+4}{2}\cdot\frac{\sqrt{67}-\sqrt{63}+4}{2}\cdot}$$

$$\overline{\cdot\frac{\sqrt{67}+\sqrt{63}-4}{2}\cdot\frac{\sqrt{63}+4-\sqrt{67}}{2}} = \frac{1}{2}\cdot\frac{1}{4}\cdot\sqrt{(67+\sqrt{67\cdot 63}+4\sqrt{67}-\sqrt{63\cdot 67}-63-4\sqrt{63}+}$$

$$\overline{+4\sqrt{67}+4\sqrt{63}+16)(\sqrt{67\cdot 63}+63-4\sqrt{63}+4\sqrt{67}+4\sqrt{63}-16-67-\sqrt{67\cdot 63}+4\sqrt{67}} =$$

$= \frac{1}{8} \cdot \sqrt{(20+8\sqrt{67})(8\sqrt{67}-20)} = \frac{1}{8} \cdot \sqrt{4288-400} = \frac{1}{8} \cdot \sqrt{3888} = \frac{1}{8} \cdot 4 \cdot 9 \cdot \sqrt{3} = \frac{9\sqrt{3}}{2}$

$\boxed{\text{Javob: } \frac{9\sqrt{3}}{2}}$

N3

$(y+\sqrt{x})(y-x^2)\sqrt{1-x} \leq 0$

$(y+\sqrt{x})(y-x^2) \leq 0$

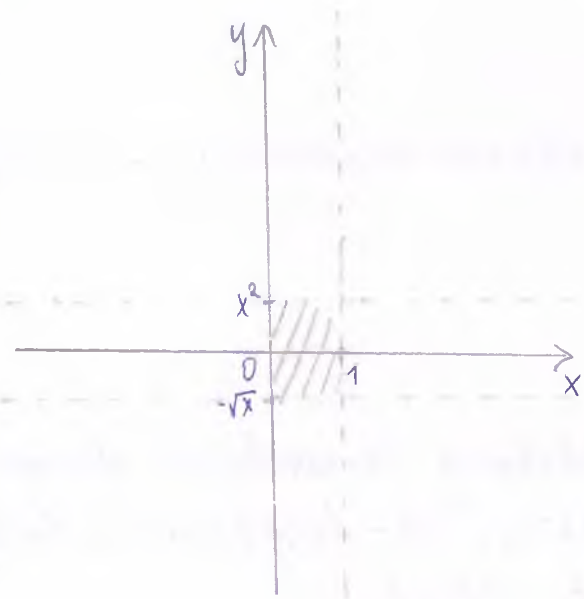
$x \geq 0$

$1-x \geq 0$

$x \leq 1$

$x \in [0;1]$

$y \in [-\sqrt{x}; x^2]$



$S = \sqrt{x} \cdot 1 + x^2 \cdot 1 = x^2 + \sqrt{x}$

$\boxed{\text{Javob: } S = x^2+\sqrt{x}\ ;\ S=2}$

N4

$N=3$

	1	2	3
1			+
2	+		
3	+		

Ya'ni har biri 1-dan sovğa olgan.
I-chi – 2 ta, II-chi – 0 ta, III chi – 1 ta sovğa bergan.

$\boxed{\text{Javob: } N=3}$

Izoh: „qaysi N>1 uchun" deyilgani uchun, javobda faqat 1-ta N keltirdim.

N5

$n, m \in N$

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

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

$m^3 + 13 \cdot 21 = n^3 + 13 \cdot n$

$n = 21$

Boshqa hollar:

$m^3 - n^3 = (m-n)(m^2 + mn + n^2) = 13n - 273 = 13(n-21)$

$n \neq 21$

1) $m - n = 13/k$

$m^2 + mn + n^2 = (n-21) \cdot k$

$mk - nk = 13$

$mk = nk + 13$

$m, n \in N$ - uchun

$k = 1; 13$

$\underline{k = 1}$

$m = n + 13$

$n^2 + 26n + 169 + n^2 + 13n + n^2 = n - 21$

$3n^2 + 38n + 190 = 0$

$D = 1444 - 2280 < 0 \Rightarrow \varnothing$

$\underline{k = 13}$

$m - n = 1$

$m = n + 1$

$n^2 + 2n + 1 + n^2 + n + n^2 = 13n - 273$

$3n^2 - 10n + 274 = 0$

$D < 0 \Rightarrow \varnothing$

2) $m - n = 13k$

$m^2 + mn + n^2 = (n-21)/k = (m-n)^2 + 3mn$

$m = n + 13k$

$m^2 + mn + n^2 = 169k^2 + 3n(n + 13k) = nk - 21k$

$169k^2 + k(21 + 38n) + 3n^2 = 0$

$D < 0 \Rightarrow \varnothing$

Faqat $n = 21 \leftarrow$ javob.

$\boxed{\text{Javob: } n = 21;\ \Sigma = 21}$