



Фиксация санитарных выходов:

1 выход:	12:05	возвращение:	12:07
2 выход:	13:22	возвращение:	13:24
3 выход:		возвращение:	
4 выход:		возвращение:	
5 выход:		возвращение:	

Время окончания:

Всего листов:

$$\begin{array}{r} \underline{2025 \cdot 7} > \underline{4095} \\ x & y \end{array}$$

$$\begin{array}{r} x > 3y \\ \cancel{x} < 4y \end{array}$$

~~nx > 4y~~

4n

~~x > y~~

~~nx > 4y~~

~~nx - 4y > 0~~

~~4yn~~

~~3yn - 4y > 0~~

3yn > 4y (на

~~3n - 1 > 0~~

3yn - 4y > 29 \cdot 4095

nx - 4y > 29 \cdot 4095



n' > 4n + 4^n

5 5

+ 4

49 группами с одним

По индукции:

1) Для 10: $n! \geq 4^n + 4n$

2) шаг.

$$n! + \underbrace{n! \cdot n} \geq 4^n + \underbrace{3 \cdot 4^n} + 4n + \underbrace{4}$$

Сравним: $n! \cdot n \geq 4^n + 3 \cdot 4^n + 4$

$$n! \cdot n \geq 4^n \left(3 + \frac{4}{4^n} \right)$$

$\swarrow \leftarrow n!$ $\nwarrow \leftarrow n$

Для $n \geq 10$: $n! > 4^n$

1) При $n = 10$: $n! \geq 4^n + 4n$

2) Пусть неравенство верно для k .

Проверим $k+1$:

$$(k+1)! \geq 4^{k+1} + 4(k+1)$$

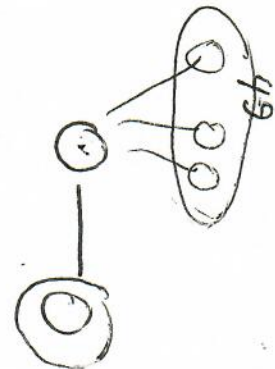
$$k! \cdot (k+1) \geq 4 \cdot 4^k + 4k + 4$$

$$\underbrace{k! \cdot k} + k! \geq 4^k + 4k + \underbrace{3 \cdot 4^k + 4}$$

Сравним: $k! \cdot k \geq 3 \cdot 4^k + 4$

$$k! \cdot k \geq 4^k \left(3 + \frac{4}{4^k} \right)$$

$$k! \cdot k > 4^k \left(3 + \frac{4}{4^k} \right)$$



6b7



$$n \leq n! - 4^n \leq 4n$$

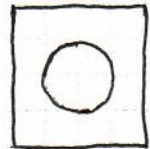
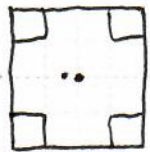
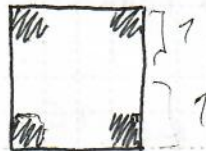
$$n + 4^n \leq n! \leq 4n + 4^n$$

$$4^n \vee n!$$



$$\underbrace{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot \dots \cdot 4}_n \vee 1 \cdot 2 \cdot 3 \cdot 4 \cdot \dots \cdot n$$

Пусть $S \geq 2$



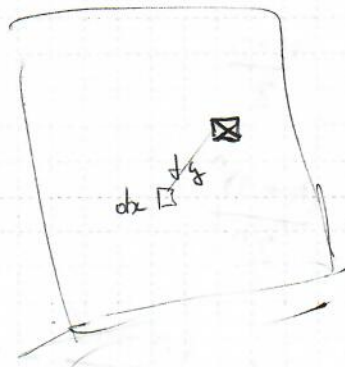
Если есть $S \Rightarrow S$ нельзя закрасить (?)



$$n \leq$$

$$n! \leq n^n$$

$$n!$$



$$n! \vee 4^n$$

$$n! \leq 2^n$$

$$n! \leq 4^n$$



40

$$n \leq n! - 4^n \leq 4n$$

$$10! - 4^{10}$$

$$2 \cdot 3 \cdot 4 \cdot \dots \cdot 10 \vee 4^{10}$$

$$n! \leq 4n + 4^n$$

$$1 \cdot 2 \cdot 3 \cdot \dots \cdot n \leq 4n + 4^n$$

$$2 \cdot 3 \cdot 5 \cdot 6 \cdot \dots \vee 4^9$$

$$1 \cdot 2 \cdot 3 \cdot \dots \cdot (n-1) \leq 4 + \frac{4^n}{n}$$

~~h! ≤ 4^n + 4n~~

$$\sqrt{h!} \leq \frac{n(n+1)}{2n}$$

$$\sqrt{h!} \leq \frac{n+1}{2}$$

$$h! \leq \frac{(n+1)^2}{4} \leq 4^n + 4n$$

$$\frac{(n+1)^2}{4} \leq 4^n + 4n$$

$$(n+1)^2 \leq 4^{n+1} + 16(n+1) - 16$$

$$k^2 \leq 4^k + 16k - 16$$

$$\sqrt[n]{h!} \leq \frac{n(n+1)}{2n}$$

$$\sqrt[n]{h!} \leq \frac{n+1}{2}$$

$$h! \leq \frac{(n+1)^n}{2^n}$$

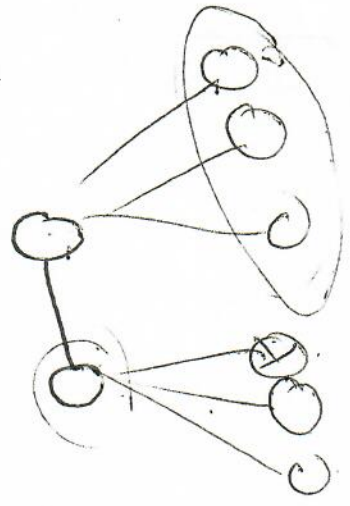
$$h! - 4^n \leq \frac{(n+1)^n}{2^n} - 4^n \leq 4n$$

8 9 10

$$(n+1)^n - (2 \cdot 4)^n \leq 4n \cdot 2^n$$

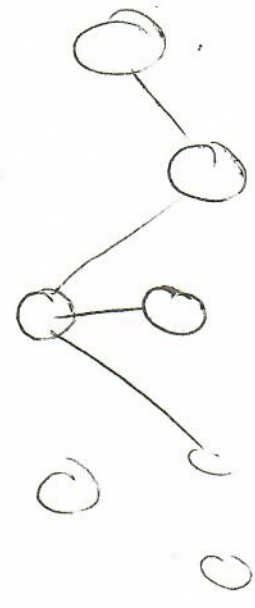
$$(n+1)^n - 8^n \leq 4n \cdot 2^n$$

$$1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot \dots \cdot n \leq 4^n$$

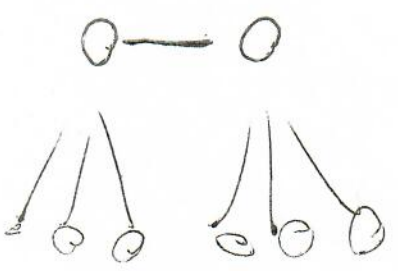


6h

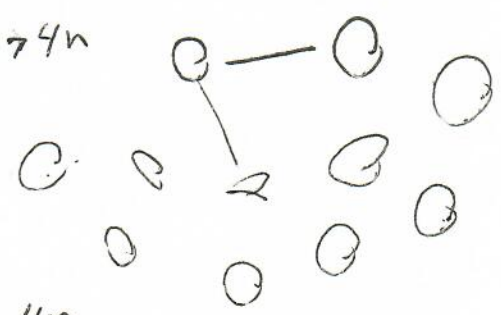
≤ 4^n



6h ⇒



≥ 5^n > 4^n



$$2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 \cdot 9 \cdot 10 \quad \vee \quad 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$$

$$81 \cdot 25 \cdot 7 \quad \vee \quad 4^6$$

$$8100$$

$$3^4 \cdot 5^2 \cdot 7 \quad \vee \quad 4^6$$

$$7k > 2025 \cdot 7 > 4095$$

$$2050$$

$$100 \cdot 20$$

$$10!$$

$$2025$$

$$81 \cdot 25$$

$$n! \leq 4^n + 4n$$

$$(n+1)! \quad \vee \quad 4 \cdot 4^n + 4n + 4$$

$$n! \cdot n \quad \vee \quad 4k$$

$$7k > 2k$$

$$7k \cdot n > 2k \cdot 4$$

$$5k \quad \vee \quad k$$

$$7n > 8$$

$$5k \cdot (n+1) \quad \vee \quad 4k$$

$$3n + 4n > 8$$

$$5n + 5 \quad \vee \quad 4$$

$$5n \quad \vee \quad -2$$



$$(2 > 10)$$

$$-4$$

$$5k \quad \vee$$

$$n! + n$$

$$\text{где } 10 \text{ } \vee \text{ } 1$$

$$n! - 4^n \leq 4n$$

$$n! + n! \cdot n \quad \vee \quad 4^n \cdot 4 + 4n + 4$$

$$n! \cdot (n+1) \quad \vee \quad 4n + 4^{n+1}$$

$$n!$$

$$\cancel{n!} \approx 4^n \approx \cancel{4n}$$

$$n! \leq 4^n + 4n$$

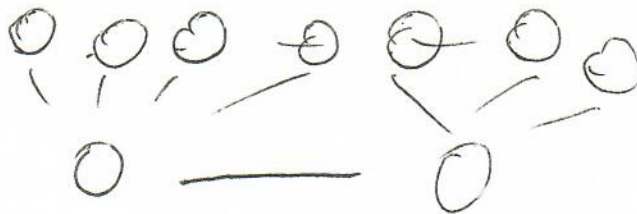
$$n! + n! \cdot n \leq 4 \cdot 4^n + 4n + 4$$

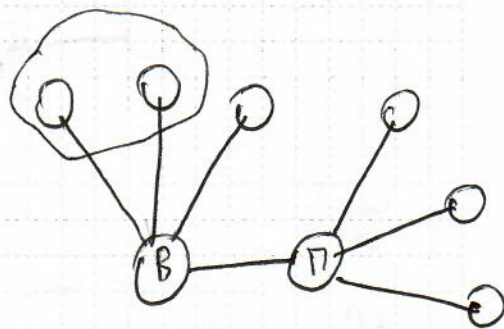
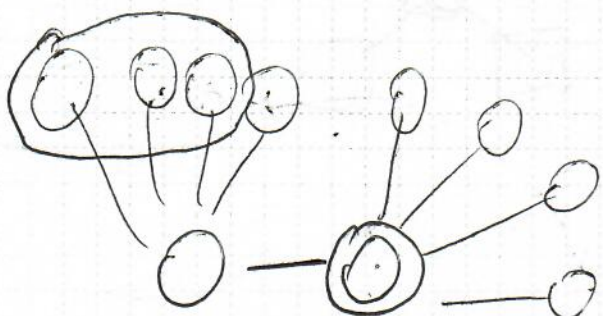
$$n! + n! \cdot n \leq 4^n + 4n + 3 \cdot 4^n + 4$$

$$n! \cdot n \leq 3 \cdot 4^n + 4$$

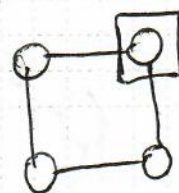
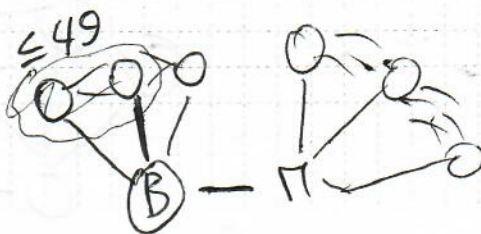
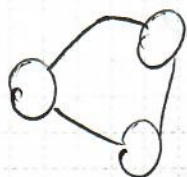
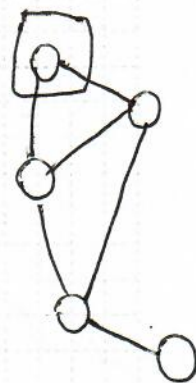
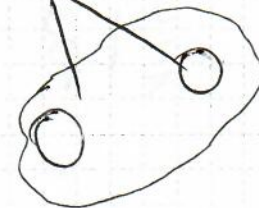
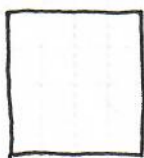
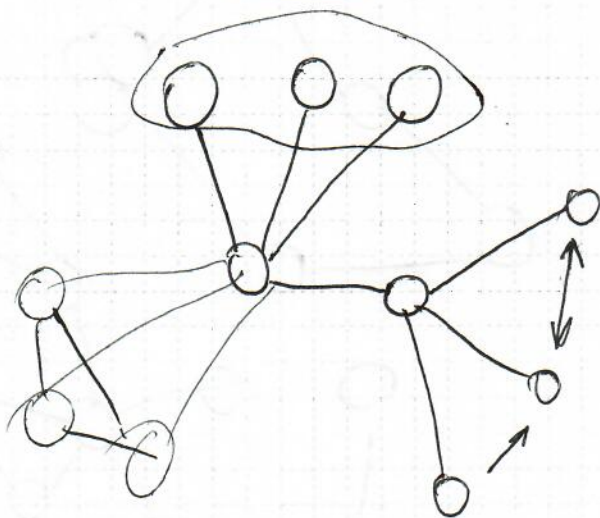
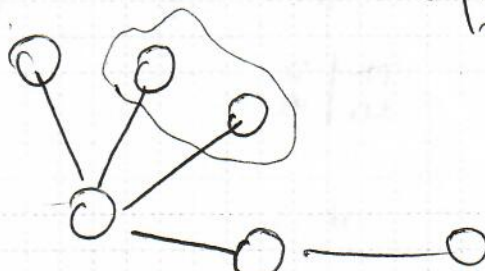
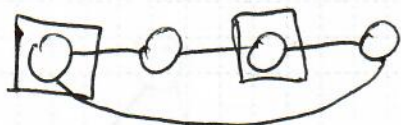
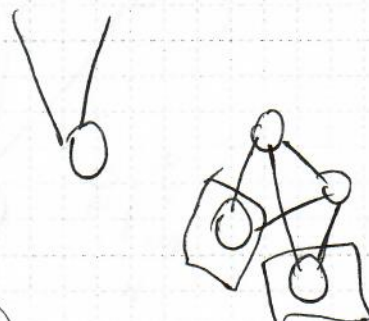
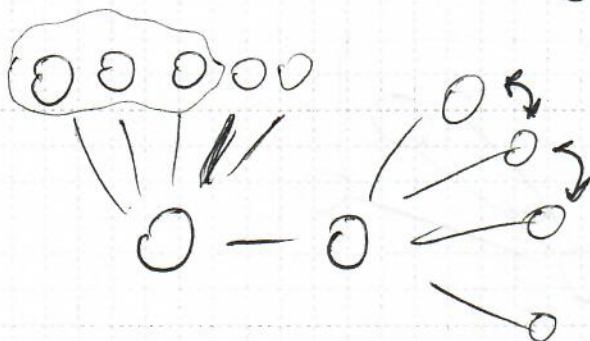
$$n! \cdot n \leq 4^n (3 + 4^{1-n}) \quad \leftarrow$$

\swarrow \searrow \swarrow \searrow
~~В~~ Π

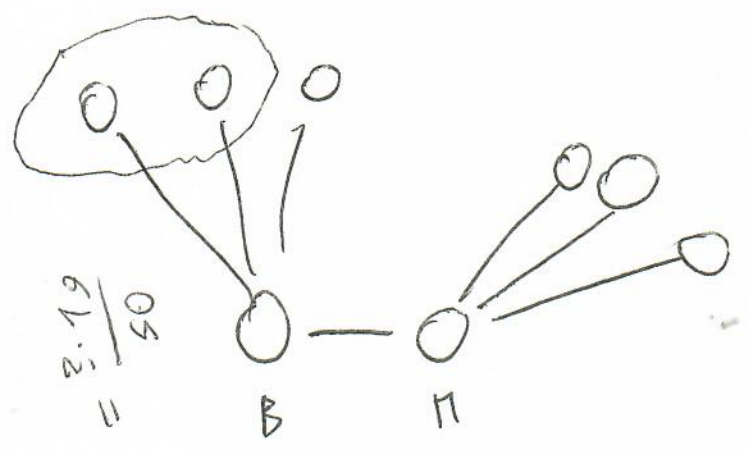
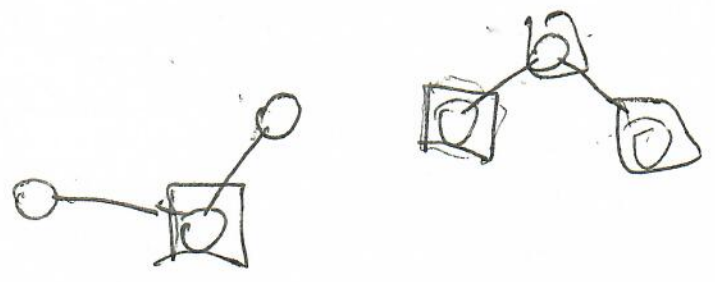




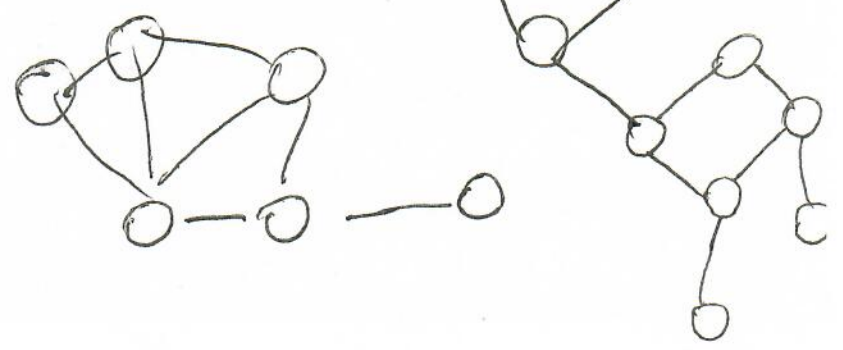
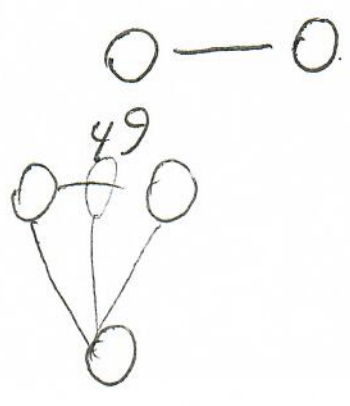
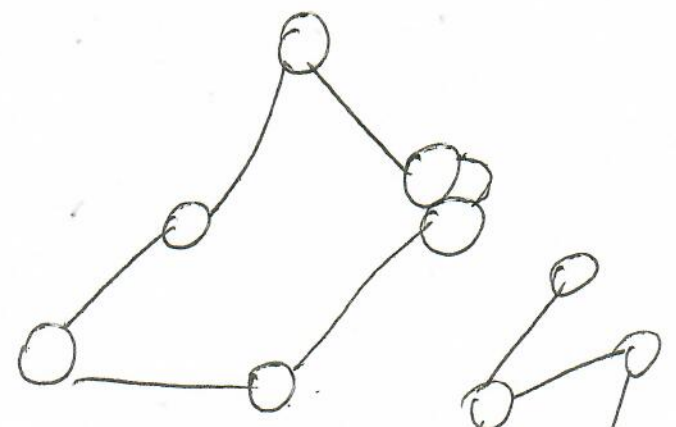
≤ 49

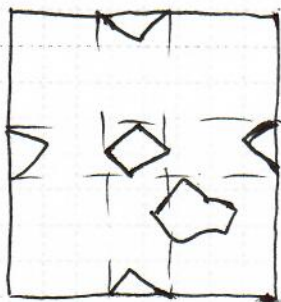
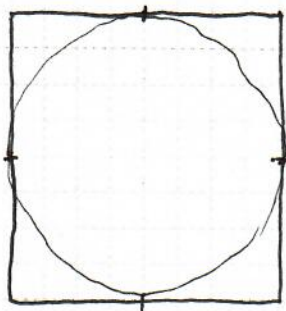


$$3 \cdot \frac{98}{100}$$

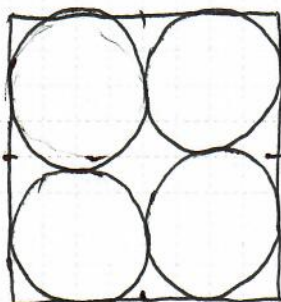


$$\frac{114}{100} = \frac{57}{50} = \frac{2 \cdot 19}{50}$$



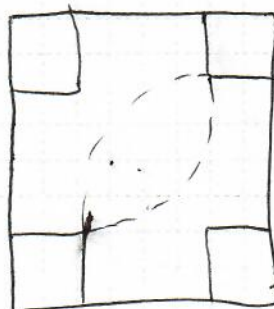
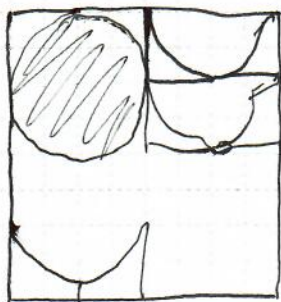
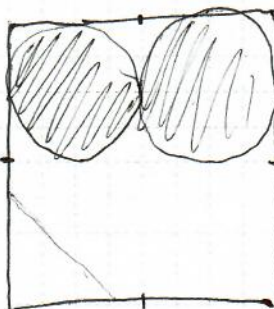
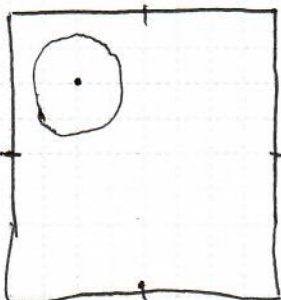
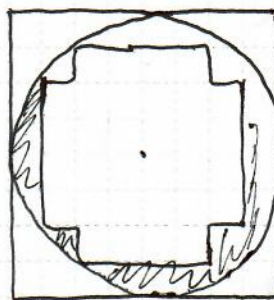
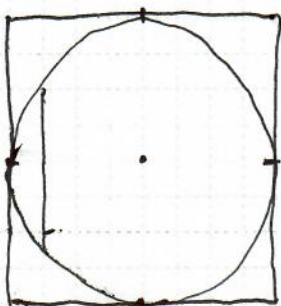
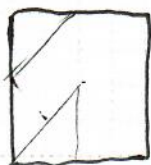


πr^2



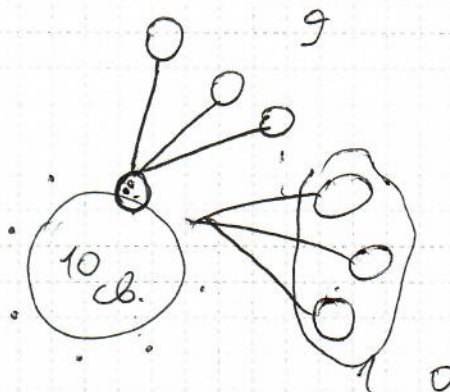
$3.14 - 2$

$0,25$





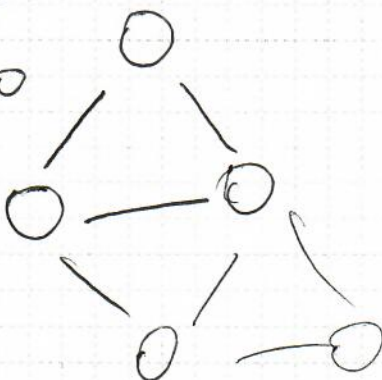
81



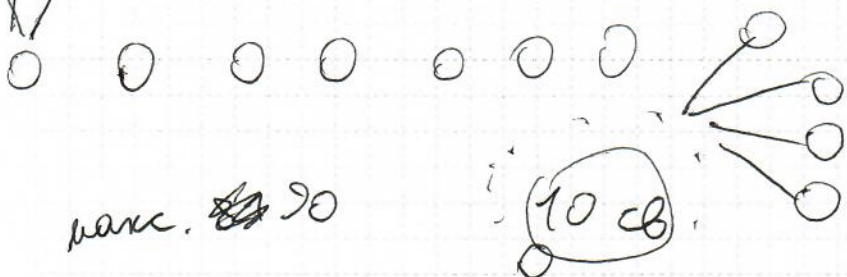
81 + 7

90

сущ. такие 10,
это у каждого
макс. 9 финк.

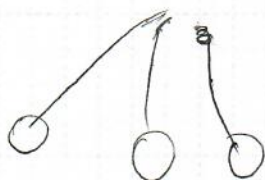


81



90

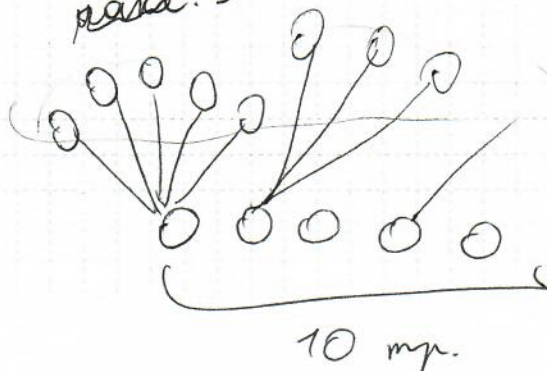
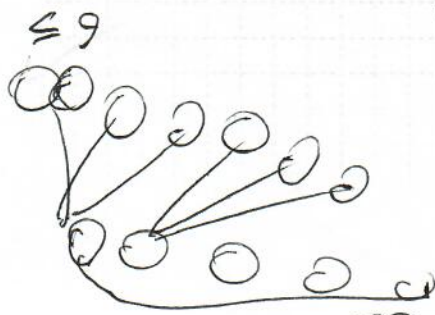
макс. ~~8~~ 90



81

~~макс. 8~~
макс. 9

81



10 тр.