

$$\binom{21}{18} = \frac{7^{10} \cdot 21 \cdot 20 \cdot 19 \cdot 18!}{18! \cdot 3! \cdot 3 \cdot 2} =$$

$$\binom{21}{18} (\underbrace{4x^2}_3)^3 \cdot \left(\frac{1}{x}\right)^{18} =$$

$$\binom{m}{k} = \frac{m!}{k!(m-k)!}$$

$$\binom{21}{18} \cdot 4^3 \cdot x^6 \cdot x^{-18} =$$

$$\boxed{x^0 = 1}$$

$(k+1)$

$$\binom{m}{k} \cdot a^{m-k} \cdot b^k = \binom{21}{k} \cdot (4x^2)^{21-k} \cdot \left(\frac{1}{x}\right)^k =$$

$$\binom{21}{k} \cdot 4^{21-k} \cdot \boxed{x^{42-2k} \cdot x^{-k}}$$

$\uparrow$
 $42-2k-k$
 x

$$\boxed{x^{42-3k}} = \boxed{x^0} = 1$$

$k = 14$ 1

$$x^L : x^m = x^{L-m}$$

$$15_{\text{wyn}} = \binom{21}{14} \cdot 4^7 \cdot \boxed{x^{14} \left(\frac{1}{x}\right)^{14}}$$

$$T: \binom{2}{0} + \binom{3}{1} + \binom{4}{2} + \dots + \binom{99}{97} = \binom{100}{3}$$

$$\text{Wzór } \binom{n}{k} + \binom{n}{k+1} = \binom{n+1}{k+1}$$

$$\binom{2}{1} + \binom{2}{2} = 2 + 1$$

$$\binom{3}{2} = 3$$

$$\begin{array}{c} \binom{0}{0} \\ \binom{1}{0} \quad \binom{1}{1} \\ \binom{2}{0} \quad \binom{2}{1} + \binom{2}{2} \\ \binom{3}{1} \quad \binom{3}{2} \end{array}$$

$$\begin{array}{c} 1 \\ 1 \quad 1 \\ 1 \quad 2 \quad 1 \\ 1 \quad 3 \quad 3 \quad 1 \\ 1 \quad 6 \quad 6 \quad 4 \quad 1 \end{array}$$

$$(a^l \cdot b^k = 1)$$

$$\left(\binom{30}{0} + \binom{30}{1} + \binom{30}{2} + \dots + \binom{30}{30} \right) = 2^{30}$$


$$(1 + 1)^{30} =$$

N: 1, 3, 5, 7, 9

P: 0, 2, 4, 6, 8

N N-2 N-4 N-6 . . . P P+2 P+4

7 9

↑ 2
N ∈ {7, 9}

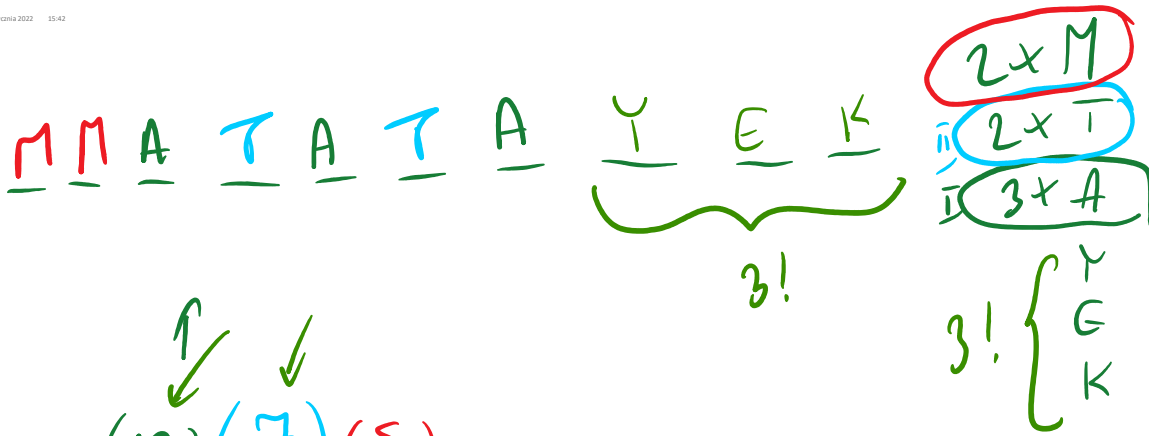
9	7	5	3
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>

7	<u>5</u>	<u>3</u>	<u>1</u>
1	1	1	1

7
p. 9 ⇒ 7 ⇒ 5 ⇒ 3
2 · 1 · 1 · 1

↓ ↓
0 ⇒ 2 ⇒ 4
10 · 10 13 · 1 · 1
0, 2, 4

2 · 3 · 10 · 10



$\begin{pmatrix} 10 \\ 3 \end{pmatrix} \rightarrow$ wybieramy 3 miejsca
 210 dr
 ident. lin A

$$\frac{\begin{pmatrix} 10 \\ 3 \end{pmatrix} \begin{pmatrix} 7 \\ 2 \end{pmatrix} \begin{pmatrix} 5 \\ 2 \end{pmatrix} \cdot 3!}{}$$

$\frac{A}{10}$

$\frac{A}{1} \cdot \frac{D}{6} \cdot \frac{E}{5} \cdot \frac{F}{4} \cdot \frac{B}{1} (+1+1)$

$\frac{A}{10}$
 $\frac{B}{1} \cdot \frac{C}{1} \cdot \frac{D}{1} \cdot \frac{E}{1} \cdot \frac{F}{1}$

$\frac{A}{1} \cdot 1 \cdot 6 \cdot 5 \cdot 4 \cdot 3 +$

$\frac{0}{1} \cdot 1 \cdot 6 \cdot 5 \cdot 4 \cdot 3$

$\frac{A}{1} \cdot \frac{0}{1}$

$(1+1) \cdot (1+1+1+1+1+1) \cdot$
 $B \cdot E$

2

A

0

2

6.2

B

C

D

E

F

0

+

6

5

$\frac{0}{1} \cdot \frac{0}{1} \cdot \frac{0}{1} \cdot \frac{0}{1} \cdot \frac{0}{1}$

$\{0, 1, 2, 3, \dots, 9\}$

$0, 1, 2, 3, 4$

$$\begin{array}{l} \text{~~~~~} \left[\begin{array}{l} \text{P} \quad 0, 4, 8 \\ \hline 5 \cdot 3 \\ \hline \text{N} \quad 2, 6 \\ \hline 5 \cdot 2 \end{array} \right] \begin{array}{l} 0, 2, 4, 6, 8 \text{ } \leftarrow \text{4 daty} \\ \text{P}' \text{ N}' \text{ P}' \text{ N}' \text{ P}' \text{ N}' \text{ P}' \text{ N}' \text{ P}' \text{ N}' \end{array} \\ \hline 5 \cdot 3 + 5 \cdot 2 \end{array}$$

1 —

$$P_2: 2 \quad P_4: 0, 4$$

$$P: 0, 2, 4$$

$$N: 1, 3$$

1 —

2 —

3 —

4 —

$$\begin{array}{l} \text{P} \\ \hline 3 \cdot 2 \\ \hline \text{R.M} \end{array} \quad \begin{array}{l} \text{N} \\ \hline 2 \cdot 1 \end{array}$$

0, ... ~

2

V

— — — — ~

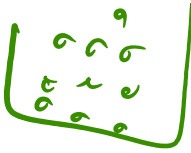
4 miejsca 9 cyfr

10 osób

5 piskin u blh

$$K \leq m$$

(P-) ↓



K =



I

II

III

IV

V

~~piskin prapier osoby~~

$\frac{I}{10}$

$\frac{I}{02}$

$\frac{I}{03}$

$\frac{I}{04}$

$\frac{I}{05}$

$\frac{I}{06}$

$\frac{I}{07}$

$\frac{I}{08}$

$\frac{I}{09}$

$\frac{I}{10}$

5 · 5 · 5 · 5 · 5

$$5 = 5^{10}$$

$$W_m^k = m^k$$

X
osobie przygry piskin
→ y
k hich och
m h piskin

~~I → B
piskin → osoba~~

(1, I)
(2, I)
(3, I)
(4, I)
(5, I)
(6, I)
(7, I)
(8, I)
(9, I)
(10, I)



~~(I, 1)
(I, 2)~~

(10 I)