Вар 20. Утусинова Екатерина

1 C_{11}^{3}

2 C_{240}^{89}

3 10^{9}

4 ввссасса

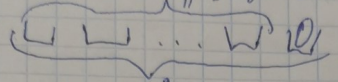
5 10

6 2743651

7 а) 7 или 33 б) $C_{14}^{7} - 8C_{9}^{7}$

8 $1 - \frac{4}{23} \cdot \frac{3}{22} \cdot \frac{2}{21}$

№1. чет. чл., $< 2^{12}$, дв. зап. 8 ед.



$\underbrace{\sqcup\ \sqcup\ \ldots\ \sqcup\ 0}_{12}$

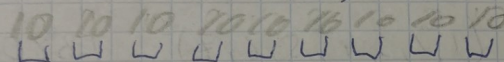
$C_{11}^{8} = C_{11}^{3}$

№2. $x_1 + x_2 + \ldots + x_{90} = 60$, $x_i \geq -1$ $\quad x_i + 2 \geq 1$

$y_i = x_i + 2$ $\quad y_i \geq 1$ $\quad y_1 + y_2 + \ldots + y_{90} = 60 + 2 \cdot 90 = 240$

Ответ: C_{240}^{89}

№3. 9-знач. в 11-ч. сист. сч., нет 2х один. подр. ц. ч.



10 10 10 10 10 10 10 10 10

$\sqcup\ \sqcup\ \sqcup\ \sqcup\ \sqcup\ \sqcup\ \sqcup\ \sqcup\ \sqcup$

10^9

1-A 0-A

-1

№4. дл. 9 $\quad A = \{a, b, c\}$ $\quad 10768$?

$a = 0$
$b = 1$
$c = 2$

$10768 \div 3 = 3589$, $3589 \div 3 = 1196$, $1196 \div 3 = 398$, $398 \div 3 = 132$, $132 \div 3 = 44$, $44 \div 3 = 14$, $14 \div 3 = 4$, $4 \div 3 = 1$

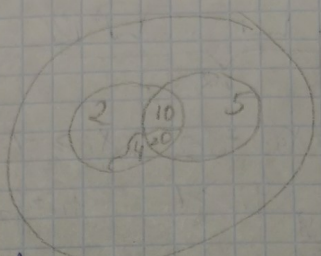
$10768_{10} = 112202211_3$

$112202211 - 1 = 112202210$

ввссассва

№5. 33, кр {2} или {5}, кон кр {10}

{2} - 15
{5} - 7
{4} - 5
{10} - 6
{20} - 3



$\{2\}+\{5\}-2\{10\} = 15+7-2\cdot 6 = 10$

№6 7 (1, 2, 3, 4, 5, 6, 7) 1380

$1380-1=1379$

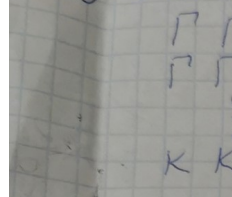
$$\begin{array}{r|l} 1379 & 2 \\ \hline -12 & 689 \\ \hline 17 & 60 \\ -16 & 29 \\ \hline 19 & -27 \\ -18 & 2 \\ \hline 1 & \end{array} \qquad \begin{array}{r|l} 689 & 3 \\ \hline 229 & 4 \\ \hline -20 & 57 \\ \hline 29 & 55 \\ -28 & 2 \\ \hline 1 & \end{array} \qquad \begin{array}{r|l} 57 & 5 \\ \hline 11 & 6 \\ -6 & 1 \\ \hline 5 & \end{array}$$

$1379_{10} = (152121)!$

1	7 6 5 4 3 2 1	2
5	7 6 5 4 3 1	7
2	6 5 4 3 1	4
1	6 5 3 1	3
2	6 5 1	6
1	5 1	5
0	1	1

2 7 4 3 6 5 1

№8. 4 кар., 19 кол., 36 карт., 4 кар. 1 масти



$$KKK = \frac{4}{4+19} \cdot \frac{3}{4+18} \cdot \frac{2}{4+17}$$

$$1 - \frac{4}{23} \cdot \frac{3}{22} \cdot \frac{2}{21}$$

№7. 8-зн. ч. в б-р. с с. A-мин., сум. $\frac{1}{54}$ < сум. на 8

B = N сумм 3. 2004. N-?, A-?

$x_1\ x_2\ x_3\ x_4\ x_5\ x_6\ x_7\ x_8 \quad x_i \in [0;5]$

1. N-?

$x_1 + x_2 + x_3 + x_4 + x_5 + 8 = x_6 + x_7 + x_8$

① $\begin{cases} x_i = a_i, & i \le 5 \\ x_i = 5 - a_i, & i > 5 \end{cases}$ ② $\begin{cases} x_i = 5 - a_i, & i \le 5 \\ x_i = a_i, & i > 5 \end{cases}$

① $a_1 + a_2 + a_3 + a_4 + a_5 + 8 = 5 - a_6 + 5 - a_7 + 5 - a_8$

$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 = 7$

② $5 - a_1 + 5 - a_2 + 5 - a_3 + 5 - a_4 + 5 - a_5 + 8 = a_6 + a_7 + a_8$

$a_1 + \dots + a_8 = 33$ Ответ: $N = 7$ или 33

2. $a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 = 7 \quad 5 \ge x_i \ge 0$

I. 1. $a_i \ge 0 \Rightarrow C_{8+7-1}^{8-1} = C_{14}^{7}$

2. $a_i \ge 5$

$a_1' = a_1 - 5$ $a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 = 7 - 5$

$a_1 + \dots + a_8 = 2 \Rightarrow C_{8+2-1}^{8-1} = C_9^7$

$C_{14}^7 - 8C_9^7$ Ответ: $C_{14}^7 - 8C_9^7$

II. $(1 + \dots + x^5)^8 = \dots + a_7 x^7 + \dots$

$x^7 = x^{y_1} \cdot x^{y_2} \cdot \dots \cdot x^{y_8} = x^{y_1 + \dots + y_8} \Rightarrow 7 = y_1 + \dots + y_8$

$f = (1 + x + x^2 + \dots + x^5)^8 = \left(\frac{1 - x^6}{1 - x}\right)^8 = \frac{(1 - x^6)^8}{(1 - x)^8} =$

$= (1 - x^6)^8 \cdot (1 + x + \dots + x^6 \dots)^8 = (1 - 8x^6 + C_8^2 x^{12} - C_8^3 x^{18} + \dots) \times$

$\times (C_{14}^7 x^7 + C_9^7 x^7) = (C_{14}^7 - 8C_9^7) x^7$ Ответ: $C_{14}^7 - 8C_9^7$