ДОМАШНЯ РОБОТА №10
З ПРЕДМЕТУ
"МАТЕМАТИЧНІ ОСНОВИ КРИПТОЛОГІЇ"

ФІ-12 Бекешева Анастасія

1. $(a+n)^n = \sum\limits_{k=0}^{n} C_k^n a^{n-k} b^k$

$$\forall \alpha \in \mathcal{F}: \qquad p\alpha = 0 \Longrightarrow C_\alpha^{p^n} = \frac{p^n!}{(p^n-\alpha)!\alpha!}, \qquad 0 < \alpha < p^n.$$

$$(a+n)^{p^n} = \sum_{k=0}^{p^n} C_k^{p^n} a^{p^n-k} b^k = a^{p^n} + \sum_{k=1}^{p^n-1} C_k^{p^n-1} a^{p^n-1-k} b^k + b^{p^n} = a^{p^n} + b^{p^n}$$

2.

$\cdot$	0	1	2	x	$x+1$	$x+2$	$2x$	$2x+1$	$2x+2$
0	0	0	0	0	0	0	0	0	0
1	0	1	2	x	$x+1$	$x+2$	$2x$	$2x+1$	$2x+2$
2	0	2	1	$2x$	$2x+2$	$2x+1$	x	$x+2$	$x+1$
x	0	x	$2x$	$2x+1$	1	$x+1$	$x+2$	$2x+2$	2
$x+1$	0	$x+1$	$2x+2$	1	$x+2$	$2x$	2	x	$2x+1$
$x+2$	0	$x+2$	$2x+1$	$x+1$	$2x$	2	$2x+2$	1	x
$2x$	0	$2x$	x	$x+2$	2	$2x+2$	$2x+1$	$x+1$	1
$2x+1$	0	$2x+1$	$x+2$	$2x+2$	x	1	$x+1$	2	$2x$
$2x+2$	0	$2x+2$	$x+1$	2	$2x+1$	x	1	$2x$	$x+2$

3. $\dfrac{1}{12}\sum\limits_{m\,|\,12} 2^{\frac{12}{m}}\mu(m) = \dfrac{1}{12}2^{12}\mu(1) + \dfrac{1}{12}2^{6}\mu(2) + \dfrac{1}{12}2^{4}\mu(3) + \dfrac{1}{12}2^{2}\mu(6) = \dfrac{2^{12}-2^6-2^4+2^2}{12} =$
$= 335$

4.