Домашняя работа.

1) $k = 36210$

$\varphi(36210) = \varphi(3621) \cdot \varphi(10) =$

$= \varphi(1207)\,\varphi(3) \cdot \varphi(5) \cdot \varphi(2) =$

$= \varphi(17)\,\varphi(71)\,\varphi(3) \cdot \varphi(5) \cdot \varphi(2) =$

$= 16 \cdot 70 \cdot 2 \cdot 4 \cdot 1 = 8960$

2) $c = 2002$

$\varphi(2002) = \varphi(1001)\,\varphi(2) =$

$= \varphi(143)\,\varphi(7)\,\varphi(2) = \varphi(13)\,\varphi(11)\,\varphi(7)\,\varphi(2) =$

$= 12 \cdot 10 \cdot 6 \cdot 1 = 720$

3) $d = 21$

$\varphi(21) = \varphi(7)\,\varphi(3) = 6 \cdot 2 = 12$

4) $m = 3$

$\varphi(3) = 2$

5) $x = 45$

$\varphi(45) = \varphi(5) \cdot \varphi(9) = \varphi(5) \cdot \varphi(3^2) =$

$= 4 \cdot 3^2\left(1 - \frac{1}{3}\right) = 4 \cdot 9 \cdot \frac{2}{3} = 24$

(2) $26^{10^3} \bmod 45$

$k = 10^3 \Rightarrow 26^k \bmod 45$

$\varphi(45) = 24$ (из п. 1)

$k = 24n + b = 10^3$

$b = 10^3 \bmod 24 = 1000 \bmod 24 = 16$

$26^{24+b} \bmod 45 = (26^{24n} \cdot 26^b) \bmod 45$

$= 26^b \bmod 45$

$26^{16} \bmod 45 = 1 \bmod 45$

$16_{10} = 10000_2$

a_i	c	c^2	$c^2 a$	$c^2 a \bmod k$
1	1	1	26	26
0	26	676	676	1
0	1	1	1	1
0	1	1	1	1

Ответ: 1

③ $x=45,\ d=21,\ k=10,\ c=2002$

$45^{31} \bmod 2002$

$31_{10} = 11111_2$

a_i	c	c^2	$c^2 a$	$c^2 a \bmod k$
1	1	1	45	45
1	45	2025	91125	1035
1	1035	1071225	48205125	969
1	969	938961	42253245	1035
1	1035	1071225	48205125	969

Odbem: 969