2) $25^{75^{10}} \bmod 36$

$k = 75^{10}$

$\varphi(36) = 12$

$k = 12\lambda + b$
$k = 75^{10}$ $\Big\} \Rightarrow b = 75^{10} \bmod 12.$

$\varphi(12) = \varphi(2^2) \cdot \varphi(3) = 4$

$75^{2^4+2} \bmod 12 = 75^2 \bmod 12.$

$b = 75^2 \bmod 12. = 9 \bmod 12.$

$x = 25^9 \bmod 36.$

$9_{10} = 1001_2.$

1	1	1	25.	25.
0	25	625	625	13.
0	13	169	169	25.
1	25	625	15625	1.

1) $\varphi(15) = \varphi(5) \cdot \varphi(3) = 4 \cdot 2 = 8$

$\varphi(2002) = \varphi(2) \cdot \varphi(7) \cdot \varphi(11) \cdot \varphi(13) = 6 \cdot 10 \cdot 12 = 720$

$\varphi(20) = \varphi(2^2) \cdot \varphi(5) = 2 \cdot 4 = 8.$

$\varphi(10) = \varphi(2) \cdot \varphi(5) = 4.$

$\varphi(36) = \varphi(2^2) \cdot \varphi(3^2) = 12.$

3. $36^{20+15} \bmod 2002 \equiv 36^{35} \bmod 2002$.

$35_{10} = 100011_2$

a_i	c	c^2	$c^2 \cdot a_i \cdot d$.	$c^2 \cdot a_i \cdot d \bmod k$.
1	1	1	36	36
0	36	1296	1296	1296.
0	1296	1679616	1679616. 36	1940
0	1940	3763600	376800	1842.
1	1842	3392964	122146704	680
1.	680	462400	16646400	1772.

~~2) 2^{20} mod 36.~~