0	9 ~~11~~	81 121	81 ~~228~~	40
1	40	1600	198800	17
1	17	289	19652	50

Exercise 3

1.

$$f(36216) = f(2)^3 \cdot f(3)^2 \cdot f(503) = 2^3\left(1-\tfrac{1}{2}\right) \cdot 3^2\left(1-\tfrac{1}{3}\right) \cdot 503 = 4 \cdot 6 \cdot 503^{502} = 12$$

$$= \boxed{12048}$$

$$f(2002) = f(2) \cdot f(7) \cdot f(11) \cdot f(13) = 1 \cdot 6 \cdot 10 \cdot 12 = \boxed{720}$$

$$f(14) = f(2) \cdot f(7) = \boxed{6} \qquad f(4) = 2^2 \cdot \left(1-\tfrac{1}{2}\right) = \boxed{2}$$

$$f(63) = f(3)^2 \cdot f(7) = 3^2\left(1-\tfrac{1}{3}\right) \cdot 6 = \cancel{12}\;\boxed{36}$$

2. $(d+5)^{k^m} \bmod x = 19^{16^4} \bmod 63$

$$K = 16^4 \implies 19^k \bmod 63$$

$$f(63) = 36 \qquad K = 16^4 = 36R + b$$

$b = 16^4 \mod 36$

$f(36) = f(12^2) \cdot f(3^2) = 12 \cdot 6 = 12$

~~$b=16$~~ $d=16$ ~~b~~ $m=4$ $k=36$

$4 = 100$

d_i	c	c^2	$c^2 \cdot d$	$c^2 \cdot d \mod t$
1	1	1	16	16
0	16	256	256	4
0	4	16	16	16

$b = 16$

$19^{36n+b} \mod 63 = 19^{36n} \cdot 19^{b} \mod 63 = 19^{b} \mod 63$

$19^{16} \mod 63$

$d = 19$ $m = 16$ $k = 63$ $16 = 10000$

d_i	c	c^2	$c^2 \cdot d$	$c^2 \cdot d \mod t$
1	1	1	19	19
0	~~19~~	~~361~~ ~~176~~	~~361~~ ~~196~~	~~46~~
0	~~46~~ ~~7~~	2116 ~~49~~	2116 ~~49~~	~~19~~ 37
0	37	1369 ~~2401~~	1369 ~~2401~~	~~46~~
0	~~46~~ ~~7~~	~~49~~ 2116	~~49~~ 2116	~~49~~ 37

Ответ: $19^{16} \mod 63 = \boxed{37}$

02
$3 = 12072$