2018^n $\quad$ 2, 0, 1, 8

$n=0 \quad 2018^0 = 1$ ✗

$n=1 \quad 2018^1 = 2018$ ✓

2, 4, 5, 8, ~~10~~, 16, 25

$2018^n \bmod 8 : 2, \underset{n=1}{4}, \underset{n=2}{0}, \underset{n=3}{0}, \underset{n=4}{0}$

ZA $n \geq 3$ $\quad 2018^n \equiv 0 \pmod{8}$ 1, 4, 2

PPS DA $2018^n = \ldots\ldots 2018$ ZA NEKO n

$\ldots\ldots 2018 \equiv 2 \pmod{8}$ ↯

ZA $n=2 \quad 2018^2 = 4072324$

x, y

$x^2 + 2012xy + y^2 = m^2$

POSMATRAMO SLUČAJEVE:

1° $x, y \geq 3$ (NEPARNI PROSTI BROJEVI)

n	n^2
0	0
1	1
?	?

(MOD 4)

3	1

ZA NEPARNO n $\quad n^2 \equiv 1 \pmod 4$

$p, q \equiv 1 \pmod 4 \Rightarrow p^2, q^2 \equiv 1 \pmod 4$

$m^2 = p^2 + 2012\,pq + q^2 \equiv 1 + 0 \cdot 1 \cdot 1 + 1$

$\equiv 0/1 \pmod 4$ $\quad \equiv 2 \pmod 4$

↯

2° B.U.O. $q = 2 \quad p^2 \geq 3$

$p^2 + 4024\,p + 4 = m^2$

$p^2 \equiv 1 \bmod 4$ $\quad \equiv 0/1 \pmod 4$

$\equiv 1 + 0 + 0 = 1$ NEMA ↯

n	n^2
0	0
± 1	1
± 2	4
± 3	1
4	0

$\pmod 8$

$n^2 \equiv 0, 1, 4 \pmod 8$

ZA NEPARNO n $\quad n^2 \equiv 1 \pmod 8$

$p^2 \equiv 1 \pmod 8$

$x^2 + 4024x + 4 \equiv 1 + 0 + 4 \equiv 5 \pmod 8$

$m^2 \equiv 0/1/4$ ↯

3^0 $x = y = 2$

$4 + 8048 + 4 = 8056 \neq m^2$

$A = 2018^{2018}$

B - ZBIR CIFARA OD A

C - — " — B

D - — " — C

$D = ?$

MOD 3 ILI 9

$A \equiv B \equiv C \equiv D \pmod{3/9}$

2018^n MOD 9: 2, 4, 8, 7, 5, 1, 2, 4, 8, 7, ...

DUŽINA CIKLUSA JE 6

2018^{2018} MOD 9: 4

2018 MOD 6 = 2

$A \equiv B \equiv C \equiv D \equiv 4 \pmod 9$

$D = 9k + 4$

$A = 2018^{2018} \leq (10000)^{2018} = 1000\ldots0$ (8072 zeros)

$B \leq 9 \cdot 8072 = 72642$

$C \leq 6 + 4 \cdot 9 = 42$

$D \leq 12$ i $D = 9k + 4$

$k = 0$

$D = 4$

$2^x = 3^y + 5$

$x = 1$

$2 = 3^y + 5$ //

$x = 2$

$4 = 3^y + 5$ //

$x = 3$

$8 = 3^y + 5 \quad y = 1$

$x = 4$

$16 = 3^y + 5$ //

$x = 5$

$32 = 3^y + 5 \quad y = 3$

PP DA JE $x \geq 6$

$2^x \equiv 0 \pmod{64}$ (MOD 128)

3, 9, 27, 81, 243

$3^y + 5 \pmod{64}$?

$3^y \pmod{64}$: 3, 9, 27, 17, 51, 25, 11, 33, 35, 41, 59, 49, 19, 57, 43, 1

PERIOD JE 16

NAMA TREBA $3^y + 5 \equiv 0 \pmod{64}$

$3^y \equiv -5 \equiv 59 \pmod{64}$

$y = 16k + 11$

$2^x = 3^{16k+11} + 5$

TREBA NAM MOD PO KOJEM ĆE DESNA STRANA BITI KONSTANTNA (NE ZAVISI OD k)

$3^{11} \cdot (3^{16})^k$

$3^{?k} \equiv 1 \pmod{?}$

MALA FERMAOVA TE

$n-1$

$x^{\varphi(n)} \equiv 1 \pmod{(12)}$

$16 + 1 = 17$

$3^{16} \equiv 1 \pmod{17}$

KOMENTAR

$x^{\varphi(n)} \equiv 1 \pmod{n}$

$3^y = 3^{16k+17} = 3^{17} \cdot (3^{16})^k \equiv$

$\equiv 7 \cdot (1)^k = 7 \pmod{17}$

$3^y + 5 \equiv 12 \pmod{17}$

2^x MORA BITI KONGRUENTNO SA 12 MOD 17

2^x MOD 17: 2, 4, 8, 16, 15, 13, 9, 1

NEMA 12 !

NEMA REŠENJA VIŠE