21CMIMCA5

Himadri Mandal

December 27, 2021

§1 Solution

Solution. Define $g(x) = f(x) + f(43 + x) + \cdots + f(46 \cdot 43 + x)$, $g(x + 43) - g(x) = f(2017 + x) - f(x)$, so we wanna find $g(43) - g(0)$. $g(x) = (-2)^x$ for $0 \leq x \leq 42$, which would be equivalent to

$$(1 - 3)^x = \binom{x}{0} - \binom{x}{1}3^1 + \cdots + \binom{x}{42}3^{42} = g(x)$$

now $g(43) = (-2)^{43} + \binom{43}{43}3^{43}$, thus the final answer is $3^{43} - 2^{43} - 1$. □