Tiebreaker Round

CCA Math Bonanza

23 Apr 2022

TB1) How many positive integer factors does the following expression have?

$$\sum_{n=1}^{999} \log_{10}\left(\frac{n+1}{n}\right)$$

TB2) Determine the last three digits of 374^{2022}.

TB3) Given that $(2\cos^2 7.5 - \cos 75 - 1)^2$ can be expressed as $\frac{p}{q}$, what is $p+q$?

TB4) Let $f(x)$ be a function such that $f(1) = 1234$, $f(2) = 1800$, and $f(x) = f(x-1) + 2f(x-2) - 1$ for all integers x. Evaluate the number of divisors of

$$\sum_{i=1}^{2022} f(i)$$