Problem 4. «Let's decode!»

Bob realized a cipher machine for encoding integers from 0 to $n-1$ by 128-bit strings using the secret function Enc. He set $n = 1060105447831$. The cipher machine works as follows: it takes as input a pair of non-negative decimal integers x and d and returns

$$\texttt{Enc}(x^d \bmod n).$$

Bob chose a secret number k from 0 to $n-1$ and asked Alice to guess it. Alice said that she can find k if Bob provides her with the cipher machine with an additional property. Namely, x can be also of the form "k", and then the cipher machine will return $\texttt{Enc}(k^d \bmod n)$. In particular, for the query "$k, 1$", the cipher machine returns

$$\texttt{Enc}(k) = \texttt{41b66519cf4356cbbb4e88a4336024da}$$

(the result is in hexadecimal notation). Here it is the cipher machine!

Prove Alice is right and find k with as few requests to the cipher machine as possible!