Problem statement The following statements are facts:

$$(10{,}000{,}000{,}000)^{\left(\frac{1}{10{,}000{,}000{,}000}\right)} \approx 1.\ 00000\ 000\underline{23}\ \underline{02585}\ \underline{09}564$$

and

$$\ln 10 \approx \underline{2}.\underline{30258}\ \underline{50929}$$

Explain the amazing coincidence of the digits.

Hint Approximate e^x when x is small.