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Solution to Problem 1038.

We will use the base change formula for logarithm,  $\log_a b = \frac{\ln b}{\ln a}$ .

$$\begin{aligned}\ln(\log x) &= \log(\ln x) \\ \ln\left(\frac{\ln x}{\ln 10}\right) &= \frac{\ln(\ln x)}{\ln 10} \\ \ln(\ln x) - \ln(\ln 10) &= \frac{\ln(\ln x)}{\ln 10} \\ \ln(\ln x) - \frac{\ln(\ln x)}{\ln 10} &= \ln(\ln 10) \\ \ln(\ln x) \left(1 - \frac{1}{\ln 10}\right) &= \ln(\ln 10) \\ \ln(\ln x) &= \frac{\ln(\ln 10)}{1 - \frac{1}{\ln 10}} \\ \ln(\ln x) &= \frac{\ln 10 \ln(\ln 10)}{\ln 10 - 1} \\ x &= e^{10 \frac{\ln(\ln 10)}{\ln 10 - 1}} \approx 78.89169411\end{aligned}$$

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