

PROPOSED PROBLEM OF NUMBER THEORY

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Let N be a positive integer. Let η be the function that associates to any non-null integer P the smallest number Q such that $\eta(Q) = P$. Find the minimum value of K from which $\eta(R) > N$ for any $R > K$.

Solution:

Lemma: For any $X > Y!$ we have $\eta(X) > Y$.

Proof by reductio ad absurdum:

If $\eta(X) = A \leq Y$, then $A! \leq Y! < X$, whence $A!$ may not be divisible by X .

Reference:

Thomas Martin, Aufgabe 1075, "Elemente der mathematik", vol. 49, No. 3, 1993.

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