Problemen

| Problem Section

Problem A

Let n be a natural number and suppose that $A_1,\ldots,A_n$ are different subsets of $\{1,\ldots,n\}$. Prove that there is a $k \in \{1,\ldots,n\}$ such that $A_1 \setminus \{k\},\ldots,A_n \setminus \{k\}$ are different.

Problem B (proposed by Hans Zantema)

Let $f,g : \mathbb{N} \to \mathbb{N}$ be strictly increasing functions. Prove that there exists an $n \in \mathbb{N}$ such that $f(g(g(n))) \geq g(f(n))$.

Problem C (proposed by René Pannekoek)

Determine all $n \in \mathbb{N}$ such that $2^n - 1$ divides $3^n - 1$.

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