

# Problemen

| Problem Section




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**Problem A** (Folklore)

Let  $p$  be a prime number. Determine all  $n$  such that in the binomial formula

$$(x + y)^n = \sum_{i=0}^n \binom{n}{i} x^i y^{n-i}$$

none of the coefficients is divisible by  $p$ .

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**Problem B** (Folklore)

Determine all positive real numbers  $a$  for which there exists a function  $f : \mathbf{R}_{>0} \rightarrow \mathbf{R}_{>0}$  such that the inequality

$$f(x + \delta) > \delta f(x)^a$$

holds for all  $x$  and for all  $\delta > 0$ .

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**Problem C** (Communicated by Michiel Vermeulen)

Let  $G$  be a finite group with  $n$  elements. Let  $c$  be the number of pairs  $(g_1, g_2) \in G \times G$  such that  $g_1 g_2 = g_2 g_1$ . Show that either  $G$  is commutative or that  $8c \leq 5n^2$ . Show that if  $8c = 5n^2$  then 8 divides  $n$ .

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