Úlohy ke cvičení

Úloha 1: Show that in each group holds: $(a^{-1})^{-1} = a$.

Úloha 2: Show that in each group holds $(a \circ b)^{-1} = b^{-1} \circ a^{-1}$.

Úloha 3: Determine graphs, cycles, a factorzation into transpositions, the number of inversions, the sign, and the inverse permutations for the following permutations: p, q and their compositions $q \circ p$ and $p \circ q$.

(Permutations are composed as mappings, i.e. $(q \circ p)(i) = q(p(i))$.)

a) $p = (1, 2, 7, 6, 5, 4, 3, 8, 9)$, $q = (1, 3, 5, 7, 9, 8, 6, 4, 2)$.

Úloha 4: Find a permutation on 10 elements s.t. p^i is not the identity (i.e. $p^i \neq \imath$) for all $i = 1, \ldots, 29$.

Úloha 5: Show that every permutation on n elements can be decomposed into transpositions of form $(1, i)$ for $i \in \{2, \ldots, n\}$.

Determine a bound of the length of the resulting factorization.