

Topics for Exam # 1

- Groups: definition and examples: \mathbb{Z} , \mathbb{Q} , \mathbb{R} , $\mathbb{Z}/n\mathbb{Z}$, $GL_n(\mathbb{R})$, $GL_n(\mathbb{F}_p)$,
 $Q_8 = \{\pm 1, \pm i, \pm j, \pm k\}$.
The group of bijections of a set.
Cyclic groups, abelian groups.
- Subgroups: subgroups of \mathbb{Z} , \mathbb{Q} , \mathbb{R} , $\mathbb{Z}/n\mathbb{Z}$, A_4 , S_4 .
Subgroup generated by a subset.
- The symmetric group S_n : cycles, transpositions, decomposition into disjoint cycles, order of a permutation, type of a permutation, conjugation in S_n , even/odd permutations and the alternating subgroup A_n .
- Homomorphisms and isomorphisms: definition and examples.