List of Questions

1. Divisibility, prime numbers, fundamental theorem of algebra*, \(d(n)\) function, greatest common divisor, least common multiple*.

2. Congruences, operations with congruences*. Linear congruences, their solvability* and methods for their solutions. Simultaneous congruence systems*.

3. Euler's \(\varphi(n)\) function, reduced residue system. Euler-Fermat theorem*, little Fermat theorem*. Euclidean algorithm*, its application for solving linear congruences.


6. Definition of \(\mathbb{R}^n\) and subspaces of \(\mathbb{R}^n\). Linear combination, generated (spanned) subspace, generating system, linear independence (2 definitions and their equivalence*), exchange theorem (no proof), I-G inequality*.

7. Basis, dimension*. Standard basis, the dimension of \(\mathbb{R}^n\). Coordinate vector, its uniqueness*. Existence of a basis in a subspace of \(\mathbb{R}^n*\).


12. Linear mappings: definition, basic properties, examples. Matrix of a linear mapping*. Composition (product) of linear mappings, its matrix*. Inverse of a linear transformation*.


(Theorems and statements with a * were proved in the lecture.)