

Test from Discrete mathematics 24/11/2016

Name and surname	1	2	3	4	5	Sum

Two points for every task. Use a space below the tasks for answers.

1. Find a rule defining some bijection $f : \mathbb{N} \rightarrow \mathbb{S}_0^-$ where \mathbb{S}_0^- is a set of non-positive even integers.

2. Let R, S be relations on set $\{1, 2, 3\}$. Decide if the following implications are valid. Prove your claim.

a) $R \circ S$ is transitive $\Rightarrow R, S$ are transitive,

b) R, S are antisymmetric $\Rightarrow R \cup S$ is antisymmetric.

3. Find some mapping $f : \mathbb{R} \rightarrow \mathbb{R}$, such that its kernel J_f satisfies

$$x J_f y \Leftrightarrow x = y \vee x + y = 2.$$

4. List all partitions of set $\{1, 2, 3, 4\}$ provided that $[1] \neq [2]$.

5. For given relation $\alpha = \{(a, b), (a, c)\}$ on set $\{a, b, c, d\}$ find a smallest relation β which is an equivalence relation and $\alpha \subseteq \beta$.