Algebra 2

Tutorium 3

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Summer Semester 2023
11.05.2023

Exercise 1. Show that the ring $\{f : \mathbb{R} \to \mathbb{R} \mid f \text{ continious}\}$ is not Noetherian.

Exercise 2. Let A be a Noetherian ring and $f : A \to A$ a surjective ring homomorphism. Show that f is also injective.

Exercise 3. Determine the nilpotent elements in the ring $\mathbb{Z}/n\mathbb{Z}$ for $n \geq 2$ a natural number. Are the nilpotent elements the same as the zero-divisors? Give an explicit example of a reduced ring which is not a domain.

Exercise 4. Let A be a commutative finite ring. Show that $\mathcal{N}_A = \mathcal{J}_A$.