

Winter 2019 Math 309 Topics for Exam 2

Axioms and Propositions for \mathbb{Z} . Know (The numbers in this section relate to the document “Basic properties of the Integers” posted on the class website)

- Section 2, Propositions 2.1, 2.2, 2.7
- Section 3, Proposition 3.2, Corollaries: 3.5, 3.6, Definitions 3.12 and 3.13, Exercises 3.14 and 3.15
- Section 4, Several equivalent formulations of Axiom WO, Definition 4.1, Propositions 4.2 and 4.3
- Section 5, Theorem 5.1

Sequences, Induction and Recursion. Know

- Some common sequences, the basic properties of the summation notation
- The formulas for the sums of an arithmetic progression and a geometric progression with proofs
- The definition of a countable set and how to prove that the set \mathbb{Z} is countable.
- The concept of cardinality for sets and how to prove that $\mathcal{P}(\mathbb{Z}^+)$ is not countable.
- The formal statement of the Principle of Mathematical Induction (and a proof from the notes “Basic properties of the Integers”)
- How to do proofs involving both versions of the Mathematical Induction
- How recursive definitions work and proofs involving recursively defined functions