
Math 307
Review sheet for Exam #1

The exam will cover the material from the first three homework sets. The best thing you can do to prepare for the exam is to study these sets and make sure you know how to do all of the problems. The following is an overview of what we have been talking about for the first four weeks of the course:

- (1) Symbolic logic proofs. You should know the basic rules (MP, MT, RCS, LCS, CI, MPB, SI, GSP, etc.) and be able to use them in proofs. You should know how to construct truth tables, and know how to identify and verify tautologies. You should be able to correctly use the Deduction Theorem and Proof by Contradiction. Finally, you should know (and be able to use) the following tautologies:

$$\begin{aligned}\sim [P \wedge Q] &\iff [\sim P \vee \sim Q] \\ \sim [P \vee Q] &\iff [\sim P \wedge \sim Q] \\ \sim [P \Rightarrow Q] &\iff [P \wedge \sim Q], \\ [P \vee Q] &\iff [\sim P \Rightarrow Q].\end{aligned}$$

- (2) Quantifiers. You should be able to construct simple expressions involving the two quantifiers “for all” and “for sum”, and you should be able to identify whether such expressions are true or false. You should know the rules for negating statements with quantifiers.
- (3) You should understand how to do basic arithmetic and algebra in the rings \mathbb{Z}_n , and how to use this to solve more complex problems (like finding the remainder when 6533221 is divided by 11, or when 7^{1000} is divided by 5). You should understand operation tables, and the basic idea of rings.