

MATH 250 PRACTICE EXAM 1

The first exam will be seven questions, 5/7 of which will be nearly identical to the homework problems. The other two will not be nearly identical, but solvable using the exact same techniques (similar to the last problem below).

To prepare, I suggest first making sure that you can do (without your notes) all of the homework and examples from class (including the worksheet problems discussed in class; some of the worksheet problems that we didn't discuss are too difficult for the exam). Once you are solid on that, if you'd like more practice, try doing some of the worksheet problems that we didn't do in class, or some of the hw problems that weren't assigned. (Some of which have solutions in the back.) I also suggest making a list of all of the problem solving techniques that you have learned.

Here is a sample of what to expect.

- (1) Negate the following: " $\forall x \in \mathbb{Z}, \exists y \in \mathbb{Z}$ such that if $xy \neq 0$, then $\forall z \in \mathbb{Z}, yz = 0$ ".
- (2) Prove that if n^2 is odd, then n is odd.
- (3) Prove that $\log_7 13 / \log_7 29$ is irrational.
- (4) Recall that the Fibonacci numbers are defined by $F_1 = F_2 = 1$ and the recurrence $F_n = F_{n-1} + F_{n-2}$. Prove (via induction and contradiction) that successive Fibonacci numbers have no common divisors other than 1. (I.e., prove that for all positive integers n , F_n and F_{n+1} have no common divisors other than 1.)