

Math 5653. Fall 2016. Brief study guide for the final.

The final exam will be given on Saturday, December 10, 9am-12:10pm, in our usual classroom Chemistry 305. The exam will cover the material from the entire course. The current plan is that there will be 6 or 7 problems, with roughly one problem on each of the following topics:

- (1) Solving polynomial congruences (Lectures 1-5)
- (2) Euler function and the structure of unit groups U_n (Lecture 6-10)
- (3) Quadratic congruences and quadratic reciprocity (Lectures 11-13)
- (4) Euclidean domains and sums of squares (Lectures 14-16)
- (5) Pell's equation, continued fractions and Pythagorean triples (Lectures 17-20)
- (6) Arithmetic functions (Lectures 21-22)
- (7) Zeta functions, Dirichlet series and the proof of Dirichlet's theorem (Lectures 23-24, 26-28)

I recommend doing all of the following as preparation for the final:

- (a) go over homework problems and test problems
- (b) go over class notes
- (c) solve additional problems from the book as well as problems that were formulated as exercises during the lectures

It is possible that some final problems will be taken directly from the homework. I will not be asking you to reprove any theorems from class, but it may be very helpful to know at least the outlines of the proofs of the main theorems, as some final problems may be based on similar ideas.

You should also work through Spring 2013 final, but keep in mind that the amount and the order of material covered in Spring 2013 as well as the general structure of assignments were very different from this semester, so you should NOT expect Fall 2016 final to be similar to Spring 2013 final.