Study Guide, Exam 3, Number Theory

Exam 3 is Thursday, April 30th

The exam will cover sections 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 10.1, 10.2, 10.4, 10.5, 10.9, 10.10 from Apostol. There will be two parts to the exam:

1. **Part 1** Closed book, closed note, no calculators. For this part it is recommended that students memorize
   - Definitions of quadratic residue, quadratic non-residue, Legendre symbol, $exp_m(a)$, primitive root and $ind_y(a)$

   **Note:** Cellphones, calculators, computers, tablets and headphones will not be allowed on either part of the exam. This means that if you have an electronic version of Apostol, you cannot use a computer, tablet, or cellphone to look at the textbook on part 2 of the exam.

2. **Part 2** You can use the textbook by Apostol, and up to 17509 (two-sided) 8.5 inch by 11 inch pages of notes that you wrote yourself (no photocopies). No Calculators are allowed. It is recommended that students first study their class notes and then the text by Apostol.
   - There may be problems similar to problems 1, 2 and 3 on homework 5.
   - As discussed and demonstrated in class, there may be problems to find all quadratic residues modulo $p$ by squaring elements.
   - As discussed and demonstrated in class, there may be problems to find all powers of a particular number modulo $m$ and use the results to demonstrate properties of exponents and primitive roots.
   - As discussed and demonstrated in class, there may be problems to illustrate the sets $A(d)$ in the proof of Theorem 10.6
   - There may be a problem similar to using the index Calculus and the table on page 216 to solve problem 16 at the end of chapter 10 in Apostol.
   - One or more of the problems on this part of the exam will be selected from problems (or parts of problems) 1, 2, 3, 4 at the end of chapter 10 in Apostol.