MATH 2513-002 Midterm III topics sheet

The first two topics gave some problems on Mid II, so I am including them in Mid III material.

1. Fermat's little theorem and applications

2. Modular exponentiation

3. Linear congruence equations

4. Chinese remainder theorem

5. Sets; elements, set builder notation, universal set, empty set.

6. Subsets, unions, intersections, differences, complements, cartesian products, power sets,

7. Cardinality of sets; of power sets, of cartesian products, of sets of functions.

8. Functions; domain, codomain. Images and pre-images of subsets.

9. Injective, surjective and bijective functions.

10. Permutations. The group S_n of permutations of the set $\{1, 2, \ldots, n\}$.

11. Transpositions, cycles, cycle notation and cycle structure of permutations.

12. Braid diagram representation of permutations. Conjugation of permutations.

13. Odd and even permutations and applications.

14. Introduction to groups. Definition, elementary properties, and first examples.

15. Examples of groups from geometry (symmetry groups).

16. Isomorphisms between groups.

I will provide statements of Fermat's Little Theorem, the Chinese remainder theorem, and the definition of a group on a sheet attached to the examination.