

Discrete Mathematics (Math 210) Common Topics List¹

1. Propositions and Connectives:

- (a) Truth Tables
- (b) Logical Equivalences
- (c) Tautologies and Contradictions
- (d) Quantifiers (Universal, Existential)

2. Sets and Connectives:

- (a) Power Sets
- (b) Cartesian Products
- (c) Union, Intersection, Symmetric Difference
- (d) Countability
- (e) Cardinality
- (f) DeMorgan's Laws for Propositions and Sets

3. Functions

- (a) Domain, Codomain, Range
- (b) Injection, Surjection, Bijection
- (c) Composition
- (d) Inverse
- (e) Image of a Set and Inverse Image of a Set
- (e) Sequences (viewed as functions whose domain is a subset of \mathbb{N})

4. Methods of Proof:

- (a) Direct
- (b) Contrapositive
- (c) Contradiction
- (d) Cases
- (e) Induction

5. Integers

- (a) Divisibility
- (b) Euclidean Algorithm
- (c) gcd, lcm
- (d) Modular Arithmetic and Equivalence

¹This list was approved by the department on 4/18/19.

(e) Chinese Remainder Theorem

6. Elementary Combinatorics

(a) Combinations and Permutations of Sets

(b) Product Rule and Sum Rule

(c) Binomial Theorem

7. Relations

(a) Reflexive, Symmetric, Antisymmetric, Transitive,

(b) Equivalence Relations, Partitions