Midterm I will be on Wednesday 23 February during our regular class time. So you will have 1 hour to complete the Midterm. Notes, books and other aid are not allowed.

Chapter 1: Sets

Section 1

- Terms to know: element of a set, cardinality of a set, set builder notation, natural numbers, integers, rational numbers, real numbers, interval notation

- Symbols to know $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$, $\in$ and basic set notation

- You should know how to go back and forth between different kinds of set notation.

Section 2

- terms to know: ordered pair, Cartesian product, ordered n-tuple

- symbols to know: $A \times B$

- You should know how to count the number of elements in $A \times B$ provided A and B are finite.

- Know how to distinguish between $A \in B$ or $A \subseteq B$.

Section 3 and 4

- terms to know: subset, the power set of a set,

- symbols to know: $\subseteq$, $\mathcal{P}(A)$

- Know how to determine the cardinality of the power set of a finite set.

Section 5 and 6

- Know how to find the union, intersection and difference of two sets.

- symbols to know: $\cup$, $\cap$, $-$ and $\overline{A}$.

- Know how to find the complement of a set.

Section 7

- Know now to draw and to read a Venn diagram.

Section 8

- terms to know: indexed sets

- notation to know: $\cup_{i \in I} A_i$, $\cap_{i \in I} A_i$

Section 9-10

- Know the Division Algorithm.

- You will *not* be asked about the Well-ordering Principle or Russell's Paradox.

Chapter 2: Logic

- terms to know: statement, the mathematical meaning of *and, or* and *not*, truth table, conditional statement, biconditional, quantifiers

- symbols to know: $\vee$, $\wedge$, $\sim$, $\Leftarrow$, $\Leftrightarrow$, $\forall$, $\exists$

- You need to be familiar with *alternate* formulations of these logical statements in English. (See especially the bottom of page 44.)

- Know how to decide if a statement with *and*, *or* or *not* is true or false.

- Know how to decide if a conditional, biconditional, or quantified statement is true or false.

- Know how to determine if two statements are logically equivalent or not.

- Know DeMorgan's Laws (page 51).

Definitions

For all of the terms below, you must be able to formally state the definition from your textbook.

1. odd, even, same parity, opposite parity

2. divides, multiple, divisor

3. prime

4. greatest common divisor, least common multiple

5. congruent modulo n

6. rational number, irrational number

7. subsets, set equality

Proof Techniques

1. direct proof

2. using cases

3. by contrapositive

4. by contradiction

Things to Keep in Mind

1. If a proof technique is not prescribed, you MUST state the method you are using.

2. You should put in the "boiler-plate" language even if you cannot figure out the whole proof.

3. You should expect to *use* all of the hypotheses.

4. I will *not* ask you to prove something that is false.