## THINGS TO KNOW FOR EXAM 3

- 1. General and Previous knowledge
  - (1) All material from the first two tests

## 2. FUNCTION CHAPTER

- (1) Definition of a function.
- (2) How to check that a function is welldefined.
- (3) How to check that a rule has the correct domain or codomain.
- (4) Prove that two functions are equal or are not equal.
- (5) Understand characteristic functions.
- (6) Know the definitions of injectivity, surjectivity, and bijectivity. Know how to do proofs with these concepts.
- (7) Be able to find the image/range of simple functions.
- (8) Definition of composition.
- (9) Definition of inverse relation, and know when it is a function.
- (10) Understand pasting together.
- (11) Definition of restriction of functions.
- (12) Images and preimages (inverse images) of sets, and elements.
- (13) Know how to prove Theorem 26.12.
- (14) Understand Theorems 26.15 and 26.20.

## 3. Cardinality Chapter

- (1) Definitions of  $|A| = |B|, |A| \le |B|,$ and |A| < |B|.
- (2) Know the proof that  $|\mathbb{N}| = |\mathbb{Z}|$ .
- (3) Definitions of countable, countably infinite, and uncountable.
- (4) Know how to prove Theorems 29.2, 29.4, 30.4, 31.5.
- (5) Applications of the Schröder-Bernstein Theorem.

## 4. Analysis Chapter

- (1) Definitions of the limit of a sequence, the limit of a function, a function being continuous at a point
- (2) Be able to prove that a sequence (e.g.  $a_n = \frac{2n+3}{5n+4}$ ) converges or does not converge
- (3) Be able to prove that a series (e.g.  $\sum 2^{-n}$ ) converges or does not converge
- (4) Be able to prove that the limit of a function (e.g.  $f(x) = x^2 3x$ ) exists or does not exist at a point