Newberger Math 233 Spring 2004

Final Exam review

(1) The following list consists of terms that you may be asked to define on the final.
- Closed under addition (see the review sheet for Exam 2).
- One-to-one, onto, injection, surjection, bijection (page 127-8).
- The limit of a function as x approaches a finite number c (see the review sheet for Exam 2).
- The limit of a function as x approaches $+\infty$ (see the review sheet for Exam 2).
- Partition (page 88).
- Relation (page 91).
- Reflexive, symmetric, transitive and equivalence relation (page 92).
- Equivalence class (page 95).

(2) **Breakdown.** Your final exam will have from 6 to 8 problems, some consisting of several parts.
- (15%) You will be asked to state some of the definitions in (1).
- (25%) You will be asked about the material from Section 2.9 listed above that we discussed since Exam 2.
- (60%) You will be asked questions involving material covered on Exams 1 and 2. You will only be asked to give definitions of vocabulary listed in (1). Otherwise, you can use the review sheets for the midterm exams to guide you.

(3) **Guarantees.** You will be asked to prove statements, answer questions and provide examples involving the material covered in the course. Use your midterm exams (and the solutions available on the web) and your homework assignments to hele you prepare. In particular:
- You **will** be asked to determine if a given relation is reflexive, symmetric and/or transitive, and prove your answer is correct. You may be asked to determine the equivalence classes for an equivalence relation. You may be asked to give examples of relations having certain properties.
- You **will** be asked to prove a given set is or is not closed under addition or multiplication.
- You **will** be asked to prove that the limit of a given function is equal to a given number.
- You **will** be asked to show a function is or is not one-to-one and/or onto. Homework hints (not solutions) are available on the web for the bijections homework.
- You **will** be asked to prove a statement using mathematical induction.
- You may be asked to negate a given statement. Pay attention to complicated statements involving "for every" and "there exists." Given a statement in the form $P \Rightarrow Q$, you may be asked to state the contrapositive. You may be asked to prove a statement using the contrapositive or by contradiction.
- You **will** be asked to prove statements involving divisibility. You may be asked to prove a statement involving the greatest common divisor of two numbers. Make sure you know Corollary 6.21. You may be asked to prove a statement about prime numbers. Make sure you know Theorem 6.26.
- You **will** be asked questions about elements of sets, possibly including unions, intersections, cartesian products. Be able to sketch sets of numbers on the number line (in $\mathbb{R}$), in $\mathbb{R}^2$ or $\mathbb{C}$. Know how to show that two sets are equal or that one set is contained in another set.

(4) On a problem in which you are asked to write a proof, you will receive substantial partial credit for correctly setting up the problem and for completely explaining what you want to prove and what your assumptions are, even if you are not able to complete the problem.