

EECS 203-1
Review for Midterm 2

The midterm will be closed book and notes. It will cover Chapter 1 (functions, sequences, etc.); Chapter 3 secs. 3.1 through 3.3, and Chapter 6: 6.1, 6.3, 6.4 and 6.5 You should bring your own blue book to the exam. It will be held in Chrysler Auditorium as before. It is designed to be done in less than an hour. I will try to give you exactly an hour.

I will ask you (i) to repeat definitions and principles; (ii) to work specific examples; and (iii) to prove something.

Definitions and topics:

- Functions; understand intuitive definition. Be able to define surjective, bijective, and injective functions.
- Definition of functional composition.
- Inverse function: when do you get such, and what equations does it satisfy?
- Sequences;
- Definition $f = O(g)$ for functions $f, g : \mathbb{R}^+ \rightarrow \mathbb{R}^+$.
- Be able to list (and do!) basic kinds of informal proofs;
- First and second principles of mathematical induction (complete statements); doing induction proofs.
- Know how to specify recursive definitions of functions, sequences, and sets;
- Link these with induction;
- Def: binary relation from A to B; binary relation on A;
- Def: reflexive, symmetric, antisymmetric, transitive relations;
- Know how to pass back and forth among different representations of relations (matrices, graphs, sets of ordered pairs)
- Def: composition $S \circ R$ of two relations R and S ;
- Know the theorem characterizing transitive relations in terms of composition;
- reflexive, symmetric, transitive closures of a binary relation:
- Inductive definition of transitive closure.
- Powers of a relation; formula for transitive closure of a general relation.
- Formula for transitive closure in matrix representation.
- Definition of equivalence relation; definition of partition; definition of the equivalence class of an element.