

FIRST MIDTERM REVIEW

1. OVERALL INFO

You will have 50 minutes for the exam. There will be a combination of computations and proofs. The proofs will be taken directly from the text or the homework. I will give point values for pacing purposes. This exam covers Chapters 0-2. Be sure to study smart - if you don't know what commutativity is, don't find solutions to the pentagon game, which was not even covered.

2. CHAPTER 0

Know the triangle and square games; be able to find a solution, given a few numbers on the object. Know the various transformations which give new solutions from a given solution - and be able to say how they interact, and how they give all solutions in the triangle case. Know how to show what sides sums are possible.

3. CHAPTER 1

Be able to write sets of various kinds in as many different notations as possible. Understand and be able to give examples of the various set operations - subset, intersection, etc. Know what a Cartesian product is, and how to tell whether a subset of it is a function or not. Know the definitions of and examples of function words - image, domain, range, onto, one-to-one. Know how to use binary operations, and be fully familiar with the axiom system A1-A4, M1-M4, and D. Be aware of which ones hold for \mathbb{R} , \mathbb{C} , \mathbb{Q} , \mathbb{N} , \mathbb{Z} , parity arithmetic, and one's digit arithmetic. Especially be able to verify statements about one's digit arithmetic. Know what an Abelian group and commutative ring are.

4. CHAPTER 2

Know which theorems we proved in class or in the homework; be able to prove a fair share of them from the axioms, including the order system O1-O4. Especially note cancellation in addition and multiplication (and when it is true and not true for multiplication), the properties of subtraction and -1 with regard to multiplication and ordering, and the special role of zero in multiplication and ordering. Be able to state the Well-Ordering Principle. Know what an integral domain is.

5. USEFUL REVIEW PROBLEMS

Not all these were assigned; they are just useful. Be sure you know how to solve assigned exercises; especially if you feel weak in a given area.

Practice Problems 0.2, 0.3

Exercises 0.1, 0.4, 0.6, 0.7

Practice Problems 1.2, 1.4, 1.6, 1.7, 1.8, 1.11, 1.13, 1.21, 1.23

Exercises 1.4, 1.7, 1.8, 1.14, 1.16(c,e,h), 1.18, 1.21(a,e), 1.23, 1.28, 1.33

Practice Problems 2.1, 2.3, 2.6, 2.8

Exercises 2.1, 2.2, 2.4, 2.9, 2.11, 2.12, 2.15, 2.18