Test I review sheet, Math 305, Spring 2025

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In this document I'll review the homework assignments, the sample test and the last lectures, and point out possible topics for test questions.

The exam will probably have 8 questions. Numbered questions will have equal value. My go to method of correcting a low average or median is to reduce the weight of the question you do worst on, but I will not do this unless the average and median are low.

The sample test: Question 1 is fair game. I may note other similar induction or WOP questions that I might ask in this space. One is the proof by strong induction or WOP that every natural number ≥ 2 has a finite factorization into primes.

Question 2 is fair game. I might ask a different summation question, though.

Question 3 is absolutely to be expected and you need to know how to compute the x and y efficiently. The computational questions in Homework 4 are all relevant examples. Asking for more than one way to express $\texttt{gcd}(a, b)$ as a linear combination of a and b is fair game.

Question 4 is fair game. I may add other theorems similar to Euclid's Lemma as candidate questions for you to review. You should be able to find such results in the notes. A list: 2.4.9, either part, 3.7.1, 3.7.2, all proved in the notes. Problem 15 in section 2.5 of Crisman is also worth reviewing.

Question 5 is nice. I would ask you to make explicit your use of the characterization of PPT's in producing your examples.

Question 6 will appear on the test. Read the notes and prepare yourself to write a convincing argument for this proposition.

Something like Question 7 is likely to appear. Im likely to ask you to tabulate multiplcative inverses in addition.

Question 8 was not covered yet in lecture; nothing about this will be on the exam.

Something like Question 9 will appear. I'm likely to cover all bases in the Linear Congruence theorem: there will be the unique case where you can in effect divide, and the case with no solutions, and the multiple solution case.

Question 10 is not covered: we will get to it next week or the week after.

Homework 1: I might ask a Venn diagram question if I feel I have room for it (questions 6,7,9 oin Judson p. 14 can be presented using Venn diagrams, for example). I think you are off the hook on direct questions about other Homework 1 topics.

Homework 2: Problem 1 on Homework 2 is fair game. There is nothing else here I am tempted to ask about at test time. If I assign this problem, be sure that you say explicitly what an injection is, and that you make sure to include references to the domains and codomains of the functions you talk about.

Homework 3: I migh ask something related to problem 5 in this homework. If I do, statements of all the order axioms in both sets will be provided.

Homework 4: Nothing not remarked on above in relation to test questions (some H4 questions are mentioned!)

Homework 5: Nothing to warn you about here which doesn't appear above.