

Math 2001 - Group Homework 6

1. Choose a new leader, scribe and presenter for this week. Each job must be filled by a different person than last time.
2. Your group's work product will be the filled-in Report on Group Work, along with the solutions to written tasks given below. These can both be handwritten, but must be written neatly. Turn both of these in on Wednesday.
3. As before, for the rest of the meeting, the leader should record on the Report of Group Work any questions for the instructor (anything your group was not able to resolve together), along with a basic narrative description of events of the meeting. Help the leader by suggesting how to briefly summarize what transpired, and wait for the leader to finish. As before, the scribe is responsible for writing up the solutions to the assigned problems. The scribe must also share copies of the returned homework with the rest of the group.
4. **Main Task 1:** Review the daily homework, your best work homework, reading, quizzes, returned group homework and in-class work covered since the last meeting. Everyone should take out old homeworks and last week's group homework, and go over solutions to each problem. Take turns, each person sharing their answers with the group. Ask questions of each other until everyone understands everyone else's answers and all questions and concerns have been resolved. If something is unresolved, put it on the list of questions for me.
5. **Main Task 2: More on congruence** $(\text{mod } n)$. Take out the worksheet we did in class on congruence $(\text{mod } n)$. Make sure everyone understands and can independently solve the entire worksheet. Do the last two problems together (problems 11 and 12), making sure that everyone understands both the questions and the answers (solutions are posted on the File Links page of the course website, so you can make sure you got the correct answers and understood the concepts). Now answer these questions (turning in your answers).
 - (a) Write down a list of multiplicative inverses $(\text{mod } 7)$ (if they exist) for all integers from 0 to 6. Each answer that exists should be a number from 0 to 6.
 - (b) Repeat the above question, but modulo 11 and 12.
 - (c) You don't need to turn this in, but it will be helpful: repeat the above question for $n = 13, 14$ and 15.
 - (d) Looking for patterns you noticed in the previous questions, make conjecture(s) about the existence of inverses $(\text{mod } n)$. Feel free to experiment with more values for n if it is helpful. Write down any conjectures you agree on and that hold up under experimentation.
6. **Main Task 3: Study for Midterm** A list of practice problems for the midterm have been posted. You do not need to turn these in, but use them as you and your group see fit. Use each other as a resource for determining where your weak spots and how you should prepare for the midterm. In particular, make sure you have done many practice problems for proofs. Support your groupmates and ask for support by getting feedback on your proofs.
7. Before the meeting ends, help the group leader make sure that the Report on Group Work has been filled in and everyone has signed it. The scribe will take home the final solutions you have written together as a group, and typeset them (with latex), or type them, or write them up neatly and turn them in. I recommend that the scribe send the final copy to the groupmates to proofread before submitting them.