

Math 2001

Group Homework 4

Before meeting with your group, each person must carefully and thoroughly read the rest of Chapter 4.

Do the following as a group:

1. Choose a leader, scribe and presenter for this week. Each job must be filled by a different person each week.
2. Your group's work product will be the filled-in Report on Group Work, along with the solutions to the problems in Main Tasks 2 and 3 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, midterm exam, and in-class work covered since the last meeting. 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. Doing a good job on this task saves you much time later in the semester.
5. **Main Task 2:** Complete the negation practice worksheet from class. Turn in one copy of it.
6. **Main Task 3:** Do the following problems. You must do these problems together, and do not show up having done them already. Do not divide up the work. Instead, on each problem spend 1-2 minutes **each thinking silently**, then construct the solutions collaboratively on one sheet of paper, discussing as you go. Do multiple drafts if necessary. Do not move on to the next problem until everyone in the group is satisfied with the result. If you find yourself getting ahead of your group, then help guide your groupmates through the solution. If you find yourself getting behind, tell your groupmates you feel lost and ask questions. Asking questions and sharing your process of confusion counts as an even bigger contribution than answering questions, clarifying and explaining. As decided in our classroom norms, it is everyone's job to gracefully make sure everyone is participating fully.
 - (a) True or false: Suppose $a, b, c, d \in \mathbb{Z}$. If $a|b$ and $c|d$, then $ac|bd$. Either prove it, or provide a counter-example.
 - (b) True or false: Suppose x and y are real numbers. If $x < y$ then $x^2 < y^2$. Either prove it, or provide a counter-example.
 - (c) True or false: If two integers x and y have opposite parity, then their product is even. Either prove it, or provide a counter-example.
 - (d) Write down the converse of the statement in the previous question. Is it true or false? Either prove it, or provide a counter-example.
 - (e) Suppose that b is an odd integer. Is $3b^2 + b + 1$ always odd, sometimes odd, or never odd? Prove that your answer is correct. Notice that if the answer is "always" or "never", you will need to write a proof, but if the answer is "sometimes", then you will have to give two examples for b , one which gives an even result for $3b^2 + b + 1$ and one which gives an odd result.