

## Math 300 homework guidelines

- All writing should be in complete sentences, and all homework must be self-contained. That means that what you write should make it clear what the question is. For instance, if the problem is: "Give an example of a prime greater than 10.", your answer might be "37 is a prime greater than 10". If the problem is "Make a truth table for the formula  $P \wedge (Q \vee \neg P)$ ." you might write "The following is a truth table for  $P \wedge (Q \vee \neg P)$ " followed by the truth table.

Sentences must start with a capital letter and end with a period.

- While students are encouraged to discuss homework with each other, the work you turn in should be your own. In particular, if two students work together to create a logical argument (the *skeleton*) of a proof, each student should write up the details of the proof independently. **Do not copy work** from another student (or any other source) and **do not allow your work to be copied**.
- Please do not write in multiple columns. Please just write your work in one column down the page: problem 1, then problem 2 below it, then problem 3 below problem 2, etc.
- Please write one sentence maximum per line. This will help me greatly in reading your work.
- Please don't break expressions across lines like this:  $32=3+4+5+13+7$ . Please just start a new line:  $32=3+4+5+13+7$  It makes things much easier to read.
- Please work the problems in order, or make it clear what the ordering is.
- Please be sure to staple your pages together. Please staple as close to the upper left-hand corner as is practicable.
- You must pick up your graded homework no later than the next class session after the one at which they are available. (For example, if I hand back the homework on Monday, and you are not there, you need to pick up the homework from me no later than Wednesday). If you do not pick up the homework in time, I will deduct points from your score.
- In most cases, your first draft of a problem will not be sufficient. Much like other writing courses, you may need to write a second or third draft to get a proof that is clear, concise, and presentable. Start on scratch paper and leave time to write up a final draft of each problem.
- Use the following terms correctly.
  - *e.g.* means *for example* (*exempli gratia* in Latin) and should be followed by a comma.
  - *i.e.* means *that is* or *in other words* (*id est* in Latin) and should be followed by a comma.
  - The words *thus*, *hence*, *therefore*, *so*, and *then* introduce a logical conclusion. The statement that follows one of these words should be a direct consequence of the preceding line of logic.
  - The words *since* and *because* should precede statements that are assumed or have been proven TRUE.
- In general, the proofs and explanations in the textbook provide good models for your writing. If you write something that looks completely different, stylistically, from what is in our textbook, you might want to reconsider how you wrote it.
- If you're typing, use italics for letters used as variables or representing mathematical symbols. For example, this is standard: "Let  $a$  be an element of the set  $E$ ", while "Let a be an element of the set E" is not as good. (Using italics also helps to distinguish the word "a" from the variable or element "a".)

- Write in the present tense and, when needed, use first-person plural pronouns (*we, us, our*), as if you and the reader are working together. For example, you might write “Next, we square both sides to obtain...” This is a mathematical convention that may seem awkward at first, but you’ll get used to it.

## Doing well

- If you do not get full points on a homework assignment, I recommend that you write up perfect solutions to the problems you lost points on, and then bring your solutions to office hours and discuss them with me.

## More specific proof writing guidelines and suggestions

- All variables must be introduced. Do not just start using a variable in statements in your writing. When you introduce a variable, you want to state clearly what it represents (a real number, an integer, a polynomial, etc.) and any properties you are assuming. Here are some examples of ways a variable may be introduced.

- Suppose  $n$  is an even integer.
- Let  $x_1$  and  $x_2$  be real numbers such that  $x_1 < x_2$ .

- Don’t write statements you are trying to prove as statements. For example, if your goal is to prove  $A = B$ , don’t write  $A = B$  and then go from there. Instead, you might start by writing “I will show that  $A = B$ .” Then, start with  $A$  (or  $B$ ) and show that it equal to  $B$  (or  $A$ ). Do not work with the equation  $A = B$ , since you need to start with something known to be true, and, since you have not shown it is true, you cannot start with  $A = B$ .

Related to this, your arguments should never end with expressions like  $0 = 0$  or  $A \setminus B = A \setminus B$ . These statements are tautologies, so they tell us nothing. If you think your argument needs to end with such a statement, you are structuring it incorrectly. Ask me for help if you cannot figure out how to restructure your argument without such a statement. Often, all that is needed is a reordering if the statements in your argument.

- Sets and statements are different things. They cannot be equivalent, or equal. For example, the set  $A \cup B$  is not equivalent to the statement  $x \in A \vee x \in B$ .
- If you want to show that  $A=B$ , one approach is to show that  $A=C$  and that  $B=D$  and that  $C=D$ .
- Please don’t use the phrase “by definition”. This is an over-relied upon phrase, and is usually unnecessary, and often incorrect.
- Please don’t use the words “clearly”, “obviously”, etc. They can be left out with no loss of clarity.
- Do not use arrows except to mean “implies” as in  $A \rightarrow B$ .
- Do not use symbols for therefore or because. Use words.