Dr. Conroy's Math 300 homework guidelines

General guidelines

1. Please write your name, the date when the homework is due, and the homework number on the first page of your homework. You must staple your pages together. Please staple as close to the upper left-hand corner as is practicable (be sure not the write to close to the upper corners of your pages - if you do, the staple may render your work unreadable).

2. All writing must be in complete english or mathematical sentences, with proper spelling, punctuation and grammar. English sentences must start with a capital letter and end with a period.

3. 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. If you are proving a theorem (i.e., you are proving **anything**), you must state the theorem in the "Theorem/Proof" format.

4. 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 present your answers to the problems in order.

5. Please write one sentence maximum per line. This will help me greatly in reading your work.

6. Please don't break expressions across lines like this: $91 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13$. Please just start a new line:

$$91 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13.$$

   It makes things much easier to read.

7. **Do not copy work** from another student (or any other source) and **do not allow your work to be copied**.

8. Make it clear where each proof starts and ends. Start a proof with **Proof** and end it with either **Q.E.D.**, the black square ■, or some other clear symbol.

9. Often, your first draft of a problem will not be adequate. 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.

10. 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 or what I present in class, then you might want to rewrite it.

11. 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

12. Make use of my office hours, and our weekly work sessions. The students who do the best tend to attend both.

13. Talk mathematics with other students at least once a week (and preferably daily!).

14. 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.

15. Remember that the purpose of the homework is to give you a chance to learn methods and concepts that you will have to demonstrate on the exams. If you don't learn them while doing the homework, when will you learn them?

16. 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 talk to me about them during office hours.

17. Send me an email at conroy@math.washington.edu with the subject line "I read the homework guidelines" before the first assignment is due and I will add one bonus point to your first homework score. Why not do that right now?

18. 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 significant points from your score.

More specific proof writing guidelines and suggestions

19. 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 $x_1 < x_2$.
    - Let n be an even integer. Then there exists an integer k such that $n = 2k$.

20. 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 is 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 $A = A$. 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 of the statements in your argument.

21. Please avoid using the phrase "by definition". This is an over-relied upon phrase, and is usually unnecessary, and often incorrect. The only way it should be used is with a reference to *what* definition you are invoking, e.g. "By the definition of power set" or "By the definition of differentiable".

22. Please don't use the words "trivially", "clearly", "obviously", etc. They can (and should) be left out with no loss of clarity.

23. Do not use arrows as logical connectors. If you want to write $A \to B$, you probably mean something like "Since A, B" and so that is what you should write.

24. Do not use symbols for therefore or because (i.e, $\therefore$ or $\because$). Use words.

25. 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.
    - "Thus", "Therefore" or "Hence" are good indicators that you are at a conclusion.
    - The words *since* and *because* should precede statements that are assumed or have been proven TRUE. Note that "since" does not require "then": we write, "Since it is raining, I am going to get wet" rather than "Since it is raining, then I am going to get wet."

26. If you are 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".) If you are seriously interested in typesetting your mathematics, you should check out LaTeX, a free, incredibly powerful system, that makes beautiful mathematics. I'd be happy to talk about it.

The most important guideline

27. If you are ever unsure about anything, just ask me. Email, discussion board, office hours, before class, in class, after class - just ask.