Rules for written assignments

Jeff Mermin

January 16, 2023

Contents

1 Purpose

This document sets out the baseline rules on academic integrity for all written (non-classroom) assignments in my classes. It does not replace or supersede the OSU academic integrity system, which will be used in case of any suspected violation. Instead, it clarifies apparent ambiguities in the rules so that students cannot use willful ignorance as a loophole. My intent is that nothing here will disagree with the broad consensus among OSU professors about what activities are or are not permissible.

1.1 Specific assignments

Sometimes my assignments will contain directions disagreeing with the rules in this document. This is to be expected: The general guidelines laid out here cannot apply perfectly in all situations. When disagreements occur, the rule is as follows: If the *written* directions for the assignment explicitly contradict this document on a specific issue, they apply on that issue. If the contradiction is only implicit, or if there is some ambiguity, this document applies.

If you think some source or activity should be allowed, but the assignment does not explicitly permit it, you may ask me. If I agree, then for your own protection you should insist on receiving my permission in writing.

2 Acknowledgements: The one unbreakable rule

If you consult or otherwise receive aid from any source, you must acknowledge the help. "Sources" include, but are not limited to, people, books, internet sites, and computer algebra programs. In my classes only, you do not need to acknowledge help from me or from the official textbook.

Your acknowledgements should take the form of a paragraph at the very beginning or very end of the assignment. This should be a simple list of your sources. This is not a list of citations, so it is not necessary (or wise) to enumerate the nature of your interaction with each source. However, people should be listed by full name to whatever extent possible, and permanent media should be acknowledged with enough bibliographic information to enable your reader to find them.

2.1 I read Alice's solution, but then did it a different way. Do I still have to acknowledge Alice?

Reading Alice's solution helped you understand the problem better, even if you ultimately didn't like or didn't understand Alice's solution. Acknowledge it.

2.2 I showed my solution to Bob after I'd finished writing it. Do I still have to acknowledge Bob?

If Bob hadn't understood your solution, you would have gone back and rewritten it more clearly. Thus the interaction with Bob helped you judge the clarity of your exposition. Acknowledge it.

2.3 Carl copied my work while I talked to Dave about something else. Do I have to acknowledge them?

No. However, if Carl then turned in the copy (or a copy of the copy, etc.), he committed at least a Level One academic integrity violation. If he did it with your permission, so did you. If he did it without your permission, you're lucky to have gotten the original back.

This is the sort of situation you really want to avoid. Be sure to maintain complete control of your work, and if you do share it with friends, insist that they truly understand everything they write.

3 Citations and Plagiarism

You can probably find complete solutions to any problem I assign - either from a classmate or on the internet. Sometimes these solutions are even correct!

Just as it would not be acceptable to xerox or print out these sources and replace their name with yours, it is not acceptable to painstakingly copy them by hand and then turn in the copy (or a copy of the copy, etc.), even if the copying introduces some small deviations from the original.

If you find a source so useful that you specifically reproduce its thoughts in your work, you need to specifically cite it near where you are using it (in addition to the acknowledgement at the beginning or end of your paper). **However, it is possible to commit plagiarism even with citation** - and even with minor wording changes here and there.

3.1 What is plagiarism?

Like many things in life, plagiarism is in the eye of the beholder. Loosely, if a disinterested but reasonable reader would think that you did the writing with the source (or a copy of the source, etc.) open in front of you, and not directly from your understanding, there's a good chance it's plagiarism.

3.2 How can I avoid committing plagiarism?

Write only what you understand. Try to avoid doing any writing (notes or your intended submission) with any sort of source (notes or originals) open in front of you. Instead, read sources for the overall structure of their arguments instead of the details, then put them aside for a while before taking notes. If you truly understood the structure of an argument, you'll still understand it after having dinner or watching a movie or similarly allowing some time to pass.

Most important: Come to office hours before seeking outside help. I very rarely assign research projects, and you can't plagiarize from a source you've never seen.

3.3 I did all that stuff and you still accused me of plagiarism. How can I defend myself?

This is rare but just possible. (I don't make this accusation without it looking very bad, as you will see when you compare your work to the apparent source.) I will want to believe you, however. Start by demonstrating that you really do understand everything you wrote, and we'll figure it out from there.

4 Group work: acknowledgment versus coauthorship

Most assignments are intended to be written up individually, but sometimes I will allow or require students to form groups of varying sizes. When students work in a group to co-author a single paper, each student becomes responsible for everything about that paper: both the ideas and the specific wording.

4.1 What constitutes coauthorship?

In professional mathematics, when two or more people are listed as authors of a paper, it is generally understood to mean two things:

- Each author made an essential contribution to the paper.
- Each author stands behind everything in the paper (including, but not limited to, its correctness, clarity, and integrity.)

Thus the community gives each author full credit for the ideas in the paper, but if something is wrong with the paper, the community assigns each author full blame.

Anyone who makes major but nonessential contributions is listed in the acknowledgments rather than as a coauthor. Likewise, anyone who isn't willing to stand behind the entire paper is moved to the acknowlegments (although in practice, this situation usually results in the paper being broken into two or more parts).

4.2 Okay, what's an essential contribution?

An essential contribution is anything without which the paper could not have been written, or would not have been recognizable. It doesn't need to be a contribution that no other author could have made: as long as it had to happen at some point, it counts. Any of the following could be essential contributions:

- Figuring out (an important part of) a solution to one of the problems in the paper.
- Figuring out (an important part of) an alternative solution to one of the problems in the paper.
- Figuring out that a proposed solution was wrong, or was unlikely to work.
- Doing most of the writing.
- Pointing out ways to make the written paper easier to understand.
- Identifying places where other coauthors' initial explanations are (or are not) sufficiently clear.

In professional contexts, it is usually clear to all participants which contributions are essential.

In the context of work for class, if groups are assigned or chosen far in advance of the due date, you should try very hard to view your teammates' contributions as essential, and to view contributions from non-teammates as inessential.

4.3 Carl isn't making an essential contribution.

If Carl is actively participating in your group meetings, he should at the least be telling you whether or not he understands what the group is doing, and that's an essential contribution. If he's not, make every reasonable effort to draw Carl into your discussions (or to reschedule your meetings so he can attend). If that doesn't work, talk to me about the situation.

4.4 My friend and I were studying together, and we realized we should probably be coauthors.

In the professional world, you would write the paper together and become coauthors. In class, you're constrained by my policies, which are in turn constrained by the university's requirement that I assign you individual grades. If it's a minor assignment, just go home and write it up separately. If it's a major assignment and you're worried that that will look like an integrity violation, discuss the situation with me (as early as possible) and we'll figure something out.

4.5 How do we decide who gets to be the first author?

In many disciplines, the order in which the authors are listed is taken to be an announcement of their relative importance to the project.

Mathematics is not one of those disciplines. Each author made an essential contribution, so each author was essential to the project. The question of who was more or less essential doesn't make sense. Thus, authors are always listed in alphabetical order by last name.

4.6 One of my coauthors cheated, but I didn't know about it.

In the professional world, your lack of knowledge wouldn't matter. When you put your name on the paper, you staked your reputation on its integrity.

In a classroom setting, your lack of knowledge should matter, but if I discover the violation I am required by university policy to investigate and, unless I can determine that you not only didn't know but also shouldn't have known, to prosecute. My ability to make that determination will depend on factors that are largely out of your control.

By far your best defense is to refuse to put your name on anything you haven't read.

5 Take-home exams

Sometimes I give take-home exams, or assignments that will be counted as extra credit on an exam. Unless the directions explicitly say otherwise, these should be treated as if they were being taken in a proctored classroom over an extended time period (with obvious adjustments to account for the fact that class, and life, are ongoing):

5.1 You may not do any of the following

- You **may not** discuss the problems, or their solutions, with any person.
- You **may not** read hints or solutions on the internet, or in any book other than the textbook.
- You **may not** use calculators or computer algebra packages on the exam problems.
- You **may not** seek help from any source other than me, the textbook, or your notes from this class.
- You **may not** submit anything that was not written under test conditions (see the next section).
- You **may not** violate academic integrity in any of the more usual ways.

5.2 You may do the following

- You **may** complain to your classmates about the difficulty (or lack thereof) of the exam.
- You **may** show the exam to any person, with the clear understanding that they will not help you.
- You **may** read the textbook.
- You **may** review your class notes.
- You **may** ask me for hints.
- You **may** participate in your other classes.
- You **may** use the library or the internet as part of your daily life.
- You **may** listen to music while you write.

5.3 I did one of those "may not"s by accident. Now what?

Tell me as soon as possible (and in particular before I find out some other way). As long as it was an accident, we will work something out with (hopefully) no penalty to you.

5.4 One of my other professors worked an exam problem in class.

That was lucky. Pay attention to the structure of the solution, though, because you can't just turn in your class notes - your submission has to be written under test conditions. And don't ask that professor for clarification until after you turn in the exam.

5.5 In the directions, the exam says we can do one of those "may not"s. Does that mean we can do the others?

No. Don't be stupid.

5.6 In the directions, the exam says we can look up some definitions on the internet. Does that mean we can look up the solutions?

No. Don't be stupid.

6 Test Conditions

When you work a take-home exam (or related assignment), you should, as much as possible, create the same conditions that would hold for an in-class exam. When you're writing, there are four such conditions.

1. You don't have access to calculators, notes, or reference material.
2. You can't get help from friends, tutors, or other people.
3. You can't leave partway through, take a rest, look things up, and then come back and finish.
4. You don't know the problems ahead of time.

Creating test conditions means simulating all of these simultaneously.

6.1 Calculators, notes, and references

Prepare your workspace ahead of time without calculators, notes, textbook, other references, or anything else you wouldn't have at an in-class exam.

6.2 Other people

Arrange so that nobody who could plausibly help you will be present while you write.

6.3 Don't leave partway through

Do everything in one sitting. If you are forced to leave, either stop and turn in what you've written, or consign that to your notes and start over from the beginning.

Notably, some assignments (especially take-home exams in advanced courses) will instruct you to work *each problem* under test conditions. In this case, you may work each problem in separate sittings. Other assignments will instruct you to work *the assignment* under test conditions. In this case, all the work you turn in must have been done in the same sitting.

6.4 You know the problems ahead of time

It's absurd to suggest you forget the the questions. Instead, make sure you are writing your understanding of the broad structure of the problem, rather than a bunch of details. Specifically, do the following:

- Identify a length of time which is too long for you to hold the details of the solution in short- or medium-term memory. For some of you this will be in the neighborhood of five minutes; for others it will be in the neighborhood of a week. I will use "24 hours" below, but substitute your time interval throughout.
- At least 24 hours before you begin writing, put away all notes and scratch work on the problem(s) you will be writing up.
- During the 24 hours before you begin writing, do not discuss the solutions you will be writing with anyone (assuming that's allowed in the first place) or look them up anywhere. If you stumble upon a solution by accident, start the clock over again at zero.

6.4.1 How am I supposed to know my time interval?

You really do understand this. If you're not going to be able to reconstruct your solution from scratch in a week or so, then it's relying on something in your short- or medium-term memory instead of your long-term memory.

A lot of students spend the minutes before an exam with their books or notes open, memorizing a formula or two for just long enough to write it on the cover of the exam as soon as it's passed out. If you're doing the equivalent of that (but know the problems beforehand, because it's a take-home assignment), you aren't putting yourself in test conditions.

6.4.2 Can you give an example?

Examples are necessarily going to be on the extreme end of things. But, okay.

The formula for the general solution of the cubic equation $ax^3+bx^2+cx+d=0$ is

$$x = \frac{b}{3a} + \left(\frac{-1+\sqrt{-3}}{2}\right)^k \sqrt[3]{-\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}} + \left(\frac{-1+\sqrt{-3}}{2}\right)^{2k} \sqrt[3]{-\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}},$$

where k can be 0, 1, or 2 and p and q are complicated expressions involving the coefficients.

For reasons that are hopefully obvious, mathematicians do not generally waste our time memorizing this formula. So I do not expect you to have it memorized either. So if the problem is to find the solutions to $x^3 - 10x^2 + 31x - 30 = 0$, and you use this formula instead of some other method, I'm going to assume that you weren't working under test conditions. Probably the only way to convince me otherwise would be to use this formula correctly without notes.

6.4.3 How about an example from calculus?

In the first unit of calculus II, there are a bunch of "reduction formulas" which look sort of like this:

$$\int \sin^n u \, du = -\frac{1}{n} \sin^{n-1} u \cos u + \frac{n-1}{n} \int \sin^{n-2} u \, du.$$

There are five or so of these in the textbook; you shouldn't waste your time memorizing them, but if you claim you have I'll believe you. There are also another couple dozen similar formulas readily available online, which I do not believe you've memorized. If you use one of them I'll assume you weren't working under test conditions. Again, you can prove me wrong by using the same formula correctly without looking it up.

6.4.4 How about an example from a proof question?

The nature of these problems makes examples here almost impossible. In general, you should expect to be able to describe the general idea of your argument a few days later. If you've memorized something from a source and don't think you'll be able to do that, you haven't understood it yet, and you aren't ready to go into test conditions.

7 Chegg and other "homework help" services

There have always been parasites out there who will do college students' homework for them in exchange for money. These organizations generally have three victims: the employees who actually do the homework and are typically paid

starvation wages, the students who pay exorbitant fees in order to deprive themselves of the opportunity to learn, and the classmates whose honest work is devalued.

As of 2020, the most prominent of these organizations is "chegg.com", which hides its dishonest intentions behind some slick ad copy involving tutoring. Don't be fooled. Real tutors don't hand you a solution to your problem and then disappear, they talk you through it step by step and make sure you understand what's going on along the way.

It is the policy of the OSU Math Department that **any use of Chegg is an academic integrity violation**. It doesn't matter if it's homework or an exam, it doesn't matter if it's closed-book or open-internet. It doesn't even matter if you did everything right according to the discussion of plagiarism a few sections ago. You may not use Chegg. The same goes for any entity with a similar business model that exists now or may arise in the future. If you want help, there are plenty of cheaper and more useful sources out there.

7.1 How can I tell whether some online tutoring service is okay to use?

There's no simple litmus test here. But generally, if someone is making their living tutoring instead of cheating, you'll be able to tell from their general attitude toward their business. Real internet tutors will want to form an actual relationship with their clients, because they can be more effective if they know your strengths and weaknesses. Real tutors are not on call 24/7. Even aside from the need to eat and sleep, if they're making a living at it they should have lots of other clients.

Most importantly, real tutors don't just hand you full solutions to your problems. In fact, the best ones never write anything down at all. They remind you what you know about the situation and verbally help you put it together so you can write the solution down yourself.

7.2 I don't form a real relationship with the MLSC tutors. Why are they okay when chegg isn't?

Read the last paragraph again. The MLSC isn't there to solve your homework for you, it's there to help you figure it out yourself.

7.3 I can google my homework and find complete solutions. Why is that okay when chegg isn't?

There's a lot going on in this question.

First of all, it's not always okay to google your homework.

Second, even when I have given you broad permission to use the internet, you don't expect a google search to turn up a complete solution. You expect to find information about one or more key terms in the problem, which you'll then be able to use as a big hint.

Third, when google does turn up a solution, it's still plagiarism if you just copy it and claim it as your own. You have to read it, understand it, add it to your acknowledgements, and finally hide the source from yourself and write it up from your understanding. You're not doing any of those things with chegg.

7.4 Why isn't it okay to use chegg if I make sure to do all that stuff?

Honestly? If it's the sort of assignment where you're allowed to use the broader internet, then it is in fact possible to use chegg as a legitimate resource. But please don't lie to yourself. You aren't giving them money for that purpose when google is cheaper and faster, and the MLSC and I will be available for free within 24 hours.

8 AI, Chatbots, and similar services

The internet contains a growing number of services that purport to be "Artificial Intelligence", which can in general provide answers to simple questions, and in some cases write essay-length responses to arbitrary prompts that appear to be written by a human. As of January 2023, the most prominent of these is ChatGPT.

As of January 2023, my impression is that, if you ask ChatGPT to solve a math problem, it will do the rough equivalent of one of the following:

1. Google the problem text, and copy the first hit without any quality control.
2. Recognize that it is being asked for a simple computation, and send that to a computer algebra system such as Matlab.
3. Do the google thing, but recognize that the numbers in the prompt are different than the ones in the google result. Send the new numbers through the algebra system, paste them in the appropriate places, and hope for the best.

To the extent that I'm correct, this is a pretty blatant case of plagiarism. A student who simply copied the ChatGPT output would thus be guilty of some sort of double plagiarism. Don't do that!

8.1 Can I use an artificial intelligence to help with my homework?

When and if actual artificial intelligence exists, the answer to this question will be easy: The AI is a source who counts a human but not a classmate. The rules about when and how you can use such sources are spelled out in sections §1 through §6, and they apply here.

Of course, if actual AI did exist, there would be serious ethical questions about asking it to do anything at all without compensation. Thankfully, we aren't there yet. Nevertheless, for academic integrity purposes, it makes sense to treat any internet service whose creator bills it as AI, or a chatbot, or similar, as you would a human non-classmate. All the rules in sections §1 through §6 apply.

9 Violations

When I become aware of a possible academic integrity violation, I am required by university policy to investigate and determine whether it is "more likely than not" that a violation occured. If I reach this conclusion, I am then required either to file papers beginning the Academic Integrity process, or to determine that the apparent violation instead constitutes a "teachable moment".

During the course of my investigations, I typically attempt to contact all students who appear to be involved.

If I seem to be asking you about something connected with academic integrity, I am probably either at the very beginning or the very end of the investigation. You have all the usual due process rights, including the right to maintain your silence. However, if you won't talk to me, I won't be able to conclude that we have a "teachable moment".