

Troubles in Maths

John McCuan

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I recently received an email from a distance learning student with the subject line “Troubles in Maths.” The student started by writing something like this:

I am writing to you today because I have a lot of troubles keeping up with the maths assignment of your class. To be honest, they take me about 25 hours per week, as I try to do everything I can do. The problem is that this is a time that I do not really have and it keeps me from doing other important things (I have an exam next week that I have not started studying for and I have to find an internship for June and I cannot find the time to write my resume nor to send any application).

The student went on to describe other specifics that might also be relevant to other students too, but this should be enough to give the basic idea. The student said the experience of other students was similar, and I suspect that this might very well be the case, though I am not so happy to think so. With that in mind, I’ve typed up an edited version of my response with the hope that it might be helpful to students who have a similar experience.

Before you read my (edited) response, I’d like to point out the sort of hopeful “message” that from my point of view, there is no reason for any student to experience anything like this in my course. Mathematical questions are, in some sense, rather delicate and complicated sometimes, especially when you are trying to learn about them for the first time. It may also be true that for many students the “learning curve” associated with what I am discussing and my assignments in particular is pretty steep. At some level, however, you have control over the steepness. This is true in several different ways. One way in which this control is in your hands is that I am quite open to modify the topics of discussion. Of course, it would be inconsiderate for one of you, say a student who didn’t really master all the mathematics he might have mastered

as well as he might have mastered it in calculus, or ordinary differential equations or whatever, to reduce the discussion to such a low level that essentially no one is learning anything new. But honestly, it's pretty hard to do that. For one thing, probably many of the other students also didn't learn calculus as well as they might have, and any review of any topic rarely hurts too much. Of course, it can take time, but you'd be surprised how fast the discussion can ramp up from something very elementary to something of interest to, well, anyone who can be interested in mathematics at all. The bottom line, is that I do not really have a fixed agenda about what we cover or review. There is a "syllabus" or "course outline" that was put together by some administrator, but my experience suggests that these things are flexible enough, especially at this level, that I can both address pretty much any deficiency in prerequisite knowledge on the part of students and still communicate/discuss some reasonable approximation of the "official" course content.

This aspect is rather important in my view. I cannot know what you know and/or what you are interested in learning if you will not tell me. I understand you may not have complete perspective on what might be important, and of course you can rely on me to some extent to help with that, but truly the best way for you to be able to connect what you know to new material is to first take something you know and try to build on that. Many of the assignment problems may not fall into that category, but if you can find one—if you can find something—then we can work from there, I can modify the material presented appropriately, and more and more assignment problems will become accessible. If you don't say anything, I'll just make assignments that seem reasonable to me, and I'll have no way to know they are meaningless to you.

Another way you should take responsibility for your own experience is suggested above and emphasized in the letter below: No one is making you spend time on the assignments. You can pick and choose. If something interests you, concentrate on that. If something seems to be of no interest or does not make sense, either ask about it or don't worry about it. Don't spend hours and hours on something which makes no sense to you.

Related to this last point is the following point of view, which you might consider: You are a graduate student now. You should basically take control of how you spend your time and what you are interested to learn. Never jump through a hoop for the sake of jumping through a hoop. Again, if you are interested to learn something and you have the time to try to learn it, then make it your own decision to spend your time that way...or not. I'm happy if we can communicate about mathematical ideas, but it doesn't bother me in the least if your interests lie elsewhere and/or you don't

have time for it. That is the way I expect it to be for graduate students.

Here is my response to the distance learning student(s):

Do not worry. Spend what you consider to be a reasonable amount of time and learn what you can. It sounds like you imagine my course is like other courses, and that I am like other instructors. That is not the case. I'm sorry the "distance learning" format doesn't work for you. I can't say it makes a lot of sense to me either, but I'm not the one who set it up or imagined that it might be helpful. I think there are many other students for whom it doesn't work too well either. From my point of view, it seems like you should approach the situation as follows:

- (1) There is this course in which I am enrolled, and I have the *opportunity* to learn some multi-variable calculus, a little bit about partial differential equations, and maybe a few other things if I find them interesting.
- (2) The only reason for me to spend a minute on the course is if I find the topics discussed irresistibly interesting.
- (3) The instructor is talking about what he thinks I might find useful and/or interesting, but it is my responsibility to use my access to him to learn what I want to learn.
- (4) Most important: Put all other considerations out of your mind.

Now, please consider my suggestion above very carefully. Especially read (2) and (3) several times until you understand fully what I am suggesting. The reason for (4) is simple: There are no other considerations. If there are, you will have to tell me about them because I have no idea what they might be.

As I mentioned before, I am willing to make some reasonable effort to pursue some additional personal interaction with you. The distance makes it difficult, but we can try something. For me, I think communication by email can work pretty well—pretty much as well as anything—though I can see that "face-to-face" or something approximating that can at least seem to have some advantages. But really, if you want to make progress on the material in my course, then carefully writing up your solution to a specific problem and sending your work to me in an email is (in my estimation) the best. Then I can see exactly what you understand and can produce (or do not understand) and provide specific comments to hopefully help you make progress. But please consider carefully (1)-(4) above. If you are interested to learn

the material, then we can do something. If you're not interested, we can of course still spend our time trying to do something, but it strikes me as rather absurd to do so. There is no reason to do so. It is a waste of your time, and it is a waste of my time.

I think if you have exams in other courses that someone (you, the professor, I don't know who) thinks are important, then you should probably study for those exams. You should only spend time trying to learn the material I'm discussing in my course if you have nothing you can imagine to be more important—that is, if these are really the things you want to spend your time thinking about independent of all other considerations. Again, the reason for that is simple: There are no other considerations. (Think about that carefully.) The only reason to spend time working on the assignments in my course is...that you simply want to work on them to learn the material. There is (absolutely) nothing else. If you're interested, and you can't resist working on my assignments, I'm here to help. Otherwise, there is no reason for you to spend much time on it.

I'm also willing, to some extent, to discuss whatever interests you. (Just look at the long email I've written here about how much time you should spend on my course and on the assignments in particular. This is really not the most interesting topic for me. It seems to me those are really things for you to decide, but I'm generally willing to discuss it and try to help.) I'm sure you are generally interesting people, so whatever you're interested in is fine. Of course, I find mathematics interesting, but I can imagine no reason that interest of mine should translate into “troubles in Maths” for another human being. Certainly I don't spend my time composing assignments to cause anyone “troubles.” It seems to me that would be psychopathic behavior, and I'm not a psychopath, though it seems that of course many other instructors are psychopaths. I guess psychopaths can't really help behaving the way they do. I don't have to act in any particularly psychopathic way: If looking at and reading my assignments causes you “troubles,” then definitely you should not look at them. Why would you?

If you want me to stop composing assignments, because you feel the very act of my doing so causes you troubles, well I guess we can talk about that. Hopefully that's not what you have in mind.

If you end up with some time, and want to switch over to “having some fun learning some Maths” from having “troubles with Maths,” send me an email and let me know what you're thinking about. If you have internships and exams you would rather spend your time on, then that is no problem for me. I guess it should be no problem for you. Of course, you'll have to deal with the consequences of however you

decide to spend your time. Invest your time in reasonable things or invest in making the world just a little bit more in the image of the psychopaths. It's up to you.

John