My second semester at Berkeley, I was a Graduate Student Instructor (GSI) for Math 53, a multivariable calculus course. The main lecture of roughly four hundred students was taught by a professor, and I regularly met with smaller groups of students in "discussion sections." I looked forward to teaching this course as it touches upon many areas of mathematics (e.g. analysis, geometry, and topology to name a few), and I hoped to inspire my students by illustrating these connections. This excitement did not abate throughout the semester; at the end of every class I eagerly anticipated the next topic we would discuss, brainstorming all sorts of applications. I ended that semester confident that the course had been a great success—and then I was shocked to learn from my teaching evaluations that it had been a *complete disaster*.

Actually, my rating that semester was only slightly worse than the departmental average. In later semesters I have consistently received above-average evaluations, and I also received the Outstanding Graduate Student Instructor award in 2021 (it can only be obtained once). But in that one particular semester, from the anonymous feedback provided by students, it was clear that I had missed the mark and my teaching was ineffective for many of them. I had essentially modeled the course after my own undergraduate calculus experience rather than considering what my students needed. While a few exceptional students were keenly engaged with my teaching and spurred me on, my approach undeniably did little for the other students who silently wished I would lay off on these claimed "beautiful" connections and focus on routine exercises instead.

After reflecting on my blunder, I realigned my teaching goals to better match my students' needs. Introductory courses like Math 53 are important prerequisites for many other courses on campus. Naturally, the main objective of such a course should be to train students in the material that will be assumed in future courses. This much is obvious, but it is just as important to (1) build students' confidence in their own handling of the tools, and (2) show how the tools are *useful*. In other words, my goal is for students to have a positive relationship with the material, not just an understanding of it.

As an example of the first point, although I present some difficult problems to challenge strong students, I always provide a fair number of more straightforward exercises leading up to them. Sometimes I see GSIs assign predominantly difficult questions in class, perhaps because they are afraid of boring the students with easy ones. From my experience, this does more harm than good—a proficient student may struggle to solve any of the problems and leave feeling worse about the material.

The second point has two sides. When a new idea is introduced, I demonstrate how it enables us to study problems that we weren't previously able to, which may include applications to other fields. Conversely, if a problem *can* be solved by simpler means, I encourage students to figure that out. In particular, I believe that directions to use a particular strategy should only be provided as a hint, and never as a restriction. If it is necessary to *force* the student to use a certain approach, it is probably a poor example to begin with.

I try to give students ample time to work collaboratively. From experience, this is more effective if they first contemplate questions independently. With this in mind, I typically begin by providing some warm-up questions and then having students discuss in pairs after a few minutes of independent work. After that, we go over the problems as a class. The remaining time is spent according to the students' needs. I'll have various examples and problems prepared in reserve, but if students want me to clarify a particular topic from lecture for example, I'm happy to do that instead.

In addition to nine fall/spring semesters, I have also taught three times over the summer. All three times were for a proof-based linear algebra course consisting of around thirty-five students. I was in charge of designing and running the whole course by myself with some assistance from a

homework grader. In the summer of 2020, classes had just gone virtual and this was a very fast-paced course. From the preceding semester, I knew first-hand how difficult it was to stay engaged with classes given this sudden upheaval. I made an effort to regularly stay in contact with individual students by email to make sure nobody fell through the cracks, and the students expressed great appreciation for this.

With the gradual shifting of policies after the onset of the COVID-19 pandemic, I've experienced teaching in various formats: in-person, hybrid, and also totally virtual. Aside from calculus in Fall 2018 and linear algebra in Spring 2023, I have generally taught multivariable calculus during the school year. I have worked on improving my presentation of the material with each iteration, and I've also adapted it for changing modes of instruction. One reason I'm attracted to this course is that it gives me an excuse to draw lots of pictures, and a clear visualization can make a world of difference in this subject. With this much practice, I've gotten quite good at it: I remember being met with applause in one particularly lively discussion section after I had produced some colorful blackboard illustration for an especially daunting three-dimensional problem, and in course evaluations I am frequently complimented on this skill. But perhaps my proudest teaching accomplishment is an unofficial one: I've been able to maintain respectable attendance in 8AM classes without penalizing absences. In these last six years I've learned a lot about teaching from my students—and I believe they've learned a lot about math from me!