

# Teaching Statement

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As part of my graduate study at Brown University, I have opportunities to teach various courses in Calculus. I have been a teaching assistant and an instructor.

As a teaching assistant, my job is to run recitations and grade quizzes. A recitation usually begins with 15-20 minutes when students ask questions about the homework or class material then follows by 40 minutes when the class is divided in small groups to work on a set of problems. Sometimes there is a 10-minute quiz at the end. I would grade the quizzes and return them to the students in the next recitation. In order for the recitations to be effective, students should be comfortable asking me questions. I always encourage questions and by no means dismiss any question as trivial or irrelevant. The most important part of a recitation, I believe, is when students are working together on the given problem set as only by practicing solving problems can they internalize the concepts. When the students are working together, I would walk around the room, offer hints and clear up confusion. As Calculus courses focus on problem solving, I try to guide students through the process by emphasizing on the key steps and if possible explain to them how somebody can come up with such solutions.

I also have a chance to be the instructor of my own class. I believe this role is very important as Calculus students do most of their mathematics studying during lectures unlike their mathematics major friends. A good instructor can help them absorb the material effectively and encourage further studying outside classes. For many students of mine, the subject appears dry and uninteresting, it is therefore important to motivate them. I think it is useful to not only explain the mathematics but also discuss some applications in Physics or Engineering that inspire their discovery. Fortunately, these examples are plentiful and are well-received by the students. I once read from Professor Korner's excellent article about lecturing that "Mathematics is not a collection of facts but of processes". Hence it is not enough for me just to tell the students a theorem and how to use it to solve problems but rather I try to motivate the students by explaining the importance of the problems, and why we need new techniques to solve them, thus putting the theorem that I am about to tell them in proper context. Although this takes up more time, I believe in its effectiveness and in some sense it introduces the students to the process of mathematical discovery.

One important aspect of a mathematics class is to develop the students critical and analytical thinking skills. To achieve this, I think it is useful to converse with the students rather than lecture to them. For example when solving a problem in class, I often pause several times and ask the students to suggest what to do next. If they cannot see it immediately, I would wait for a few minutes and offer a hint. Most of the times, the students would complete the solution and feel more confident. Sometimes, what the students suggest is incorrect or does not help solving the problems and I would explain to them why it does not work and constantly remind them that

solving problems involves trials and errors and nobody expects them to get the correct solution on their first attempt. Again, it may take more time and I always need to guard against bogging down but it also increases class participation.

Another piece of advice that I learn from Professor Korner's article is that the purposes of lectures are not just communicating knowledge. Therefore I am happy to share my experience learning the subject with my students. For instance, I once told them about my amazement the first time I saw the formula

$$\sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}} = 2$$

I hope my students also shared my enthusiasm.

Teaching is important and good teachers can have big influence on the success of their students. Having had many good teachers over the years and having great respect and admiration for them, I would like to emulate my teachers to be a good teacher myself. I know it is challenging but I am willing to learn and look forward to any teaching opportunity ahead.