Teaching Statement

Yonatan Ashenafi
yonatanashenafi0@gmail.com

I use and enjoy mathematics in two main ways: through understanding beautiful and powerful mathematical concepts and arguments, and through seeing others understand and use them through my guidance. I have learned through the years, by looking at my professors, good teaching practices that equip me to reach my second means of appreciating mathematics. I want to use these learned practices to aid my students to understand and practice mathematics in a way that fosters a desire for learning. I aim to actively convince my students that the theorems and corollaries we look into are neither self-evident nor merely hypothetical and that their applications are indeed subject to them. I want to demonstrate the attractiveness of mathematics in the classroom by working out mathematical concepts and problems in a manner that shows its surprising assertiveness and effectiveness.

Over the five years at my graduate school, I have been a teaching assistant for a diverse set of mathematics classes like Calculus 2, Multi-Variable Calculus, Introduction to Differential Equations, Foundations of Applied Mathematics, Probability, and Introduction to Data Mathematics. In my recitations, I have tried to communicate the arguments that make the mathematics in these classes convincing and, consequently, powerful and beautiful. By doing this, I have helped foster curiosity for mathematics.

In each of my recitations, my goal was twofold: to get students engaged in problem-solving by motivating them with real-world applications and to convince them of the mathematical arguments by going through problems and discussing relevant ideas for each section. For the first goal, I made it a priority that each of my lesson plans for my recitations had at least one point of relevance (either in another branch of mathematics or in another science) for the mathematical arguments and derivations I was about to present. For the second goal, I developed some sense of how well a class was following me or was unconvinced and/or distracted. I then modulated my pace of mathematical derivations and my direct engagement accordingly.

Part of making sure that the students in my classes are on board is being sensitive to how students take in math and how long it might take them to do so. When students come to my office hours to discuss ideas covered in class, I do not simply repeat the recitation. I attentively listen to the student's questions and respond, paying attention to how they receive my answer. I make it a priority that I am available and accommodating to the students who find these dialogues significantly beneficial.

I have had the privilege of teaching two classes at the University of Alberta and six classes so far at Worcester Polytechnic Institute (WPI). At the University of Alberta, I taught Calculus for the Life Sciences I and Calculus for the Physical Sciences II. I am currently teaching calculus and ordinary differential equations courses at WPI. Being responsible for a class as the instructor gave me new insights into effective teaching. The most prominent one was the idea that I should direct and help grow the fire that brought the students to the class in the first place, or at the very least not extinguish it. Students join the class with various degrees and types of motivations. In my teaching philosophy, all these are good motivations. My task, however, is to maintain the

motivations that are catalytic to the class objectives. If circumstances inhibit this for some students, then I have learned to try my best in my part to not dishearten such students through such things as unnecessary dogmatic rules. Nevertheless, I fully intend to maintain discipline in my classes, as discipline itself is something students should learn and might lack coming into college. In summary, my goal is for my students to be individually motivated and convinced that the world is accessible to them while also having the discipline that makes their motivations and convictions productive.

Besides my graduate school and postdoctoral experiences, I have also had valuable co-curricular involvements in my undergraduate years, which shaped my stature as a teacher of mathematics. I worked as a tutor at my college for various undergraduate mathematics classes such as calculus, linear algebra, discrete structures, and physics classes. During my tutoring sessions, I learned how to articulate my understanding of mathematics, find joy in helping students, and do mathematics communally.

I believe that mathematics is best pursued in the community, and I have always worked to create a community around mathematics. This has been my dream starting from my years in high school where I was leading a space science club and my time in undergraduate education where I was leading the math club to my years as a Ph.D. student where I was actively engaged in creating a math reading club where we chose and discussed math textbooks like *Introduction to the Mathematics of Finance*. I believe such a community should be fostered to keep growing in mathematical knowledge while demonstrating that mathematics is a human and often social activity.

When it comes to teaching methodology, I prefer a blended classroom approach, combining in-person instruction with online preparatory learning tools. This method empowers students to prepare for class so they can be more invested during class time. By integrating online resources like short recorded lectures, lecture digests, and interactive applets (such as those on GeoGebra) I can meet diverse learning needs and encourage independent thinking. The in-person sessions allow for deeper engagement, real-time feedback, and richer conversations, creating a more effective and well-rounded learning experience.

In conclusion, my approach to teaching mathematics is grounded in a deep appreciation for both the beauty of the subject and the importance of fostering a supportive, motivating environment for my students. I strive to help students see the power of mathematical reasoning and to connect their learning with real-world applications. Through my experiences as a teaching assistant, tutor, and course instructor I have learned how to engage students actively, accommodate their diverse learning needs, and build a community where mathematics is explored collectively. Ultimately, my goal is to inspire my students to become lifelong learners of mathematics, confident in their abilities, and motivated by the challenges and rewards that the subject offers. I am committed to creating an environment where every student can find their own path to understanding and where the pursuit of mathematics becomes not just a skill, but a shared passion.