TEACHING STATEMENT

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Throughout my career as a graduate student, I have accumulated a wide variety of experiences as an instructor, including teaching as the primary instructor for College Algebra, Finite Mathematics, Calculus II, Calculus III, Multivariate Calculus, and Linear Algebra. I also led recitation sections for College Algebra, the entire calculus sequence, Multivariate Calculus, a Survey of Calculus course, and computer-based College Algebra and Trigonometry courses. Throughout these courses, I employed a variety of different strategies. In courses where I was the primary instructor, I experimented with both whiteboard lectures and fill-in-the-blank notesheet lectures; I found the notesheet lectures were beneficial to both myself and the students. In recitation sections, I employed both group work and full class participation, allowing me to observe the strengths of each. In the computer-based courses, I obtained a plethora of experience working with students one-on-one, answering not only mathematical questions but guiding them through an unfamiliar educational system. Finally, I have experience with online systems such as Blackboard, WeBWorK, and WebAssign.

My teaching philosophy is primarily informed by my experiences both as an instructor and a student. As a student, I realized it was helpful for an instructor to explain difficult concepts using colloquial language to give the big picture and answer questions such as "What are we doing?", "Why are we doing it?" and "How does it relate to previous material in the course?" For example, when teaching bases in linear algebra, I motivate the idea by pointing out that vector spaces are often large sets; we would like a smaller set that we can work with that still captures the structure of a vector space. I then introduce the idea of a basis and connect it to material from the previous section, linear independence and spanning sets. I also explain why these two ideas are exactly what we want from a basis: a spanning set allows us to "hit" every vector in the vector space using basis vectors, while linear independence ensures that our basis set is as small as possible. With these types of motivating questions in mind, one of my primary goals when teaching is to present material with clarity and context. For clarity, I thoroughly explain the logic behind theory and examples. For context, I connect new ideas or examples back to previous material, or foreshadow

future material. By being more attentive to clarity and context, explaining course material has become a strong attribute of my teaching ability.

Another technique I value is the use of active learning. I provide fill-in-the-blank notesheets to my students to encourage taking notes during lecture. However, because some material is already written for them, they do not spend as much time writing compared to a whiteboard lecture. This gives me more time to ask questions and interact with the class, allowing them to think about questions such as "What should we try next?" It also gives me additional time to focus on particular concepts that might require further explanation. With this style, I get the students to engage more with the material, which in turn helps them stay attentive during class. I have also been trying to add more group activities to my current lectures. For example, in a linear algebra course, I gave my students around 5 minutes to discuss in small groups how to start a particular 5×5 determinant. By walking around the class during this time, I heard good discussion and monitored what students were struggling with. I used the same technique a few weeks later with a less computational problem: I gave my students a set that was not a vector space and had them discuss to see if they could figure out which vector space properties failed. This helped them actively engage with the theory and gave me a good idea how well they were absorbing the material. Additionally, I also recently observed an instructor effectively use short, conceptual questions in conjunction with group discussion to motivate theory. These questions allowed for good discussion without disrupting the flow of lecture; I plan to implement this style into my lectures in the future.

I have also found it beneficial to employ technology where possible, particularly for homework assignments. I have utilized both WeBWorK and WebAssign, including composing my own assignments in WeBWorK. For computational problems, this is great for the students as they can get immediate feedback on their work. In conjunction with online homework, I will often have a short written assignment for more conceptual questions, which allows for more traditional feedback. I also contributed to computer-based College Algebra courses at both North Dakota State and South Dakota State. For these, I would supervise the lab where students could work and ask questions. At NDSU, I would also present an optional, non-computer-based lecture once per week. This computer-based style was beneficial for the students, as they were more active and independent with their learning.

Finally, I find it beneficial to inject energy and excitement into my lectures. As a student, I had instructors who were energetic and some who were not. I found those who were energetic could

more naturally hold my attention, allowing me to more easily follow the lecture and understand the material. On top of this, the structure and logic of mathematics is inherently beautiful. By showing passion while presenting, I hope to share my own appreciation of this beauty with my students.