For the King, Sirrah!

We began our independent study of Real Analysis at the start of December (because Dr. K had Drama Club, Matthew had Track, and Sameer had research). Matthew and Sameer appreciate the speed and complexity of learning. By going through Chapter 3: Set Theory in just a few days, we have covered deep, rigorous material at near lightspeed.

I, Sameer Kini, have personally loved exploring my interest in theoretical mathematics. Throughout my high school career, I have been unsure of my passions. While I can correlate my activities and localize my interests to some STEM application to social sciences, I am still determining whether I enjoy international relations itself, for example, or just the logical sequence of argumentation the course demands. I have found something fulfilling through the last few weeks of Real Analysis. Like a Costa Rican butterfly introduced to papaya: while I may not be able to relish this way forever, I can certainly take refuge in the fact that there is something out there I enjoy.

I see high school and college not as places to narrow myself to a single definition but rather as experiences to explore many options and build opportunities for the future. As such, while I may not choose to major in math or something closely related, my discipline to spend hours on a single, “trivial” problem derives from the idea that developing Real Analytical skills can be helpful for future opportunities. For example, if I choose to research applying mathematical models to optimize econometric decision-making, having an extensive background in the foundations of math means that I can create hypotheses and models and test out ideas from a position of strength.

Finally, through this course, I can discuss theoretical mathematics to the furthest extent of my current knowledge with a student and teacher (who we can consider a student of mathematics themself) that challenge and teach me more than I know. For much of my mathematical career, the math I did with others did not significantly challenge me, while the math that significantly challenged me I did not do with others. Combining the difficult mathematics with the social experience in our Real Analysis independent study has, in just a couple of weeks, been a fantastic adventure of philosophical inquiry and jovial admixture.

Real Analysis

We started our independent study with Dr. K, Sameer, and Matthew Zhao on Real Analysis this school year. The primary goal of learning Real Analysis is to gain a deep understanding of the fundamental principles and theories underlying calculus and the structure of real numbers. This knowledge will help students develop a more rigorous approach to solving real-world problems and gain insight into the behavior of functions. Furthermore, we will better understand the structure of real numbers, which can help the students in fields such as abstract algebra, topology, and differential equations. Real Analysis also provides an excellent foundation for further studies in mathematics, such as complex analysis, harmonic analysis, functional analysis, and differential geometry.

This proof-based class includes weekly problem assignments and meetings, where Dr. K reviews homework and teaches material to the students. We will complete projects, some using computer programming, to demonstrate our understanding of the material.