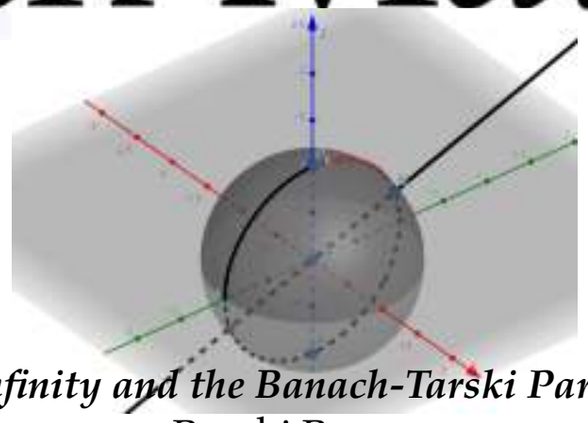
Michigan Math Club



Thursday at 4pm in EH1360
Pizza + pop outside afterwards!!

Directed Reading Program Presentations

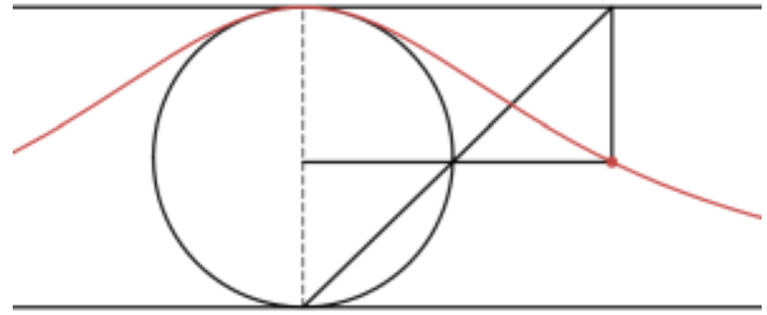
30 November 2023

Infinity and the Banach-Tarski Paradox

Raashi Ramanan

The infamous Hilbert's Hotel problem grapples with how we can add up infinities, and how they may be contained in larger sets. In this presentation, we introduce this concept, and apply it geometrically to the Banach-Tarski Paradox. This paradox deals with how we can decompose spheres of infinite points into several distinct spheres of equal size, in a bijective way. We walk through how to define each point on a sphere utilizing sets containing sequences of movements along the sphere. This process was one that involved experimentation and visualizing concepts in different ways. I have yet to prove parts of the Banach-Tarski theorem, but the procedure of uncovering how one infinity can be translated into multiple excited me.

Mentor: Olivia Strahan



Survey of Financial Applications of Probability

Carlos Rosales

In the early colonial period, shipowners insured their vessels using theoretically lax “intuitive bets, very responsive to war and rumors of war”, rooted in feeling rather than mathematical certainty. Needless to say, over the last 400 years the study of probability and statistics has developed greatly. Today massive insurance groups manage hundreds of billions of dollars worth in assets, risk is a central component to all the world’s industries, and millions of Americans manage their own personal credit. These examples are just a few of the ways that sophisticated advancements in probability have improved our understanding of the world and can be applied to reach conclusions from uncertainty. The aim of this talk will be to introduce the foundational elements that drive such innovations, and then show various ways in which they are applied.

Mentor: Marc Andrew Choi

An Introduction to Braid Groups

Maxwell Natonson

This talk will be an introduction to the theory of braid groups. We will define the Artin braid group, geometric and polygonal braids, and discuss how they’re all related to each other. We will also explore the representation of geometric braids through braid diagrams, and when we can determine if two geometric braids are isotopic by looking at their braid diagrams. Finally, we will discuss closed braids and links, with the intent of showing that any oriented link is isotopic to a closed braid..

Mentor: Runji Li