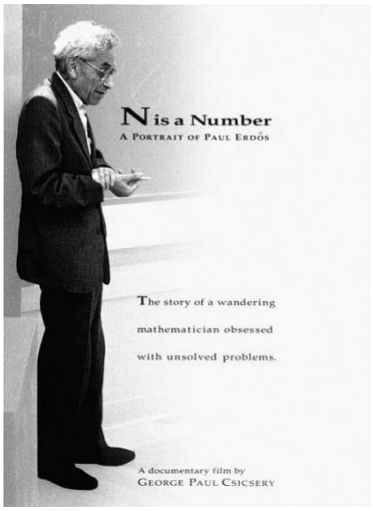
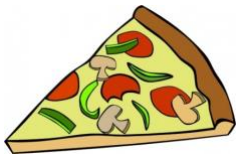
Department of Mathematics

January 30, 2023

UNDERGRADUATE MATH SEMINAR



The next math seminar will be a math MOVIE!



DATE: **THURSDAY, February 2**

Time & **12:30 –** Refreshments in **Bailey 204**

Location: **12:50 – 1:45** Seminar in **Bailey 207**

Title: N is a Number, A Portrait of Paul Erdös

Abstract: This seminar talk will not be a ``talk" but rather we will meet to watch the highly acclaimed documentary ``N is a number". The synopsis of the film (http://www.zalafilms.com/films/nisfilm.html) includes the following description:

``A man with no home and no job, Paul Erdös was the most prolific mathematician who ever lived. Born in Hungary in 1913, Erdös wrote and co-authored over 1,500 papers and pioneered several fields in theoretical mathematics.

"In an age dominated by technical wizardry and high tech communications, Erdös was an unusual human link connecting hundreds of people. As he traveled from country to country, Erdös carried with him the latest in mathematical thinking, inspiring others to develop new ideas and, sometimes, entire new fields. In turn, the mathematical community supported this repository of centuries of mathematical knowledge and lore. Every mathematician in the world has an "Erdös Number"-the number of people he or she is removed from having co-authored a paper with Erdös.

"At the age of 83 he still spent most of his time on the road, going from math meeting to math meeting, continually working on problems. He died on September 20, 1996 while attending such a meeting in Warsaw, Poland. N is a Number: A Portrait of Paul Erdös was filmed between 1988 and 1991."

Pieces from Thesis – by Aidan McAuliffe

Aidan *wrote his senior thesis this past fall under the direction of Professor Christina Tønnesen-Friedman.*

I did not know what to expect once I had chosen my thesis topic. My subject was differential geometry on curves and surfaces, but that was a pretty broad topic. I got a better idea about what I was going to center my thesis on when I met with my advisor for the first time late in my junior year. I had narrowed my focus onto the isoperimetric inequality since I had an extensive background in real analysis. From there, it was all a matter of reading the material.

The first order of business was to familiarize myself with parametrized curves and arc-length as a differentiable function. It was then that I had discovered the existence of reparametrizations of parametrized curves. Other than being a mouthful, a reparametrization of a curve is a curve that has the exact same geometric properties as the original. There are specific reparametrizations known as unit-speed reparametrization which is when the tangents vectors on every point of a curve is a unit-vector. This eventually got me to the conclusion that the only curves that have unit-speed reparametrizations are curves that are regular, or curves that entirely consist of points with non-zero tangent vectors. One of the unit-speed parameters is the arc-length. All of this was needed to prove the isoperimetric inequality which shows that among all simple closed curves, curves that meet their starting point but do not intersect, bounding a given area, the curve with the shortest length is a circle. Likewise, among all simple closed curves of a given length, the curve that bounds the greatest area is a circle.

The greatest advice I can give to anyone writing a thesis is to make sure you write it as you read the material. Writing everything using LaTeX can take a while, so you do not want to do all of it at once. Everyone talks about how stressful a thesis is, but speaking from my experience, it is not so bad if you are productive in your time. Also, I know that you need to be specific in your terminology in math, but do not just copy directly from your readings. Using your own words is just as important for a math thesis as it would be for any other subject.