

Senior Thesis Proposal

Name: Bernhard Riemann

Major + 2: Mathematics Major, German Minor, Latin GEC.

Proposed Topic: I want to work in number theory. In particular, I want to study functions which might help in understanding the distribution of prime numbers. I have a hypothesis, which I will expand in the narrative portion of this proposal.

My thesis proposal is mathematics only.

I am considering the following thesis option(s):

- fall one-semester
- two-semester honors (I would prefer this option, but if I do one semester only I would rather it be the Fall semester because I will busy in the Winter with a German theater course)

Potential Advisor(s) (all relevant fields): Carl Friedrich Gauss (Mathematics Department)

Courses I have had which support my thesis proposal:

1. Real Analysis (Math 309)
2. Complex Analysis (Math 308)
3. Abstract Algebra (Math 301)
4. Topology (Math 313)
5. Number Theory (Math 365B)

Proposal

This project came from discussing with Dr. Gauss about the distribution of prime numbers. Does the distribution follow some pattern, or is it completely random? Dr. Gauss suggested I look at functions of complex variables. My main resource for complex analysis is the book by Churchill and Brown [1].

Interesting results have been found by Jacques Hadamard in [2].

References

- [1] James Ward Brown, Ruel V. Churchill. *Complex Variables and Applications*. Seventh Edition, McGraw Hill, 2004.
- [2] Jacques Hadamard. *Sur la distribution des zéros de la fonction $\zeta(s)$ et ses conséquences arithmétiques*, Bulletin de la Société Mathématique de France **14** (1896) pp 199–220.