**Number Theory**

**MA 360, Fall 2019**

**Group Presentation**

You will have the opportunity to explore an area of Number Theory that we will not cover in this course. Through research and investigation, your group will gain a deeper understanding of a topic and present an organized and thorough explanation of your findings. Since there are 11 students in class, we will have 4 groups of two and 1 group of three.

**Topic:** Your group will want to choose a topic that has some interest to you. Spend some time exploring your options at <http://en.wikipedia.org/wiki/List_of_number_theory_topics> or other sites. Simply Google “number theory topics” and see what comes up. You may explore deeper into a famous conjecture or theorem or look into an area of number theory that we did not cover in class. Here are a few topics to consider: continued fractions, elliptic curves, Riemann zeta function, partition theory, Gaussian integers (primes), etc… I will need to approve what topic you select, but I am pretty flexible as long as it is meaningfully related to an area of number theory.

**References:** You will need multiple sources pertaining to your topic get a full and well-rounded understanding of that topic. Feel free to use books, articles, websites, or any other source you want. You will need to compile a list of at least 7 resources. *No more than three resources can be websites and at least one must come from a scholarly mathematical journal* (see library). In addition to each reference, you will also include a short (4-5 sentence) summary of the reference and what you plan to use from it in your presentation.

**Outline**: Each group is required to provide a thorough outline of their talk the week before it is given. This should include the topics being presented, who is presenting, and the order in which they are presenting. I don’t need every word of the talk, but enough to anticipate the focus and direction of each group member. You will also provide me three multiple-choice questions about your presentation. I will select one of these to put on the final exam.

**Class Presentation:** Your presentation should be a clear and thorough overview of your research. *It needs to be 20-23 minutes long (for groups of two) and 25-28 minutes long (for groups of three)*. I will be strict on this to ensure everyone has time to present. (You will want to practice beforehand to work out the timing issues). You are required to include, in some form, the following components:

* History– including relevant biographical information about related mathematicians
* Definitions of terms and notation
* Describe mathematical concepts
  + Big Picture
  + Explore the details of major theorems or results associated with topic
* Examples of concepts
* Real world application (if possible)
* Current/Future research in this area (if applicable)
* Class activity or involvement – this could be a game, worksheet, or something else to engage the class – be creative
* Treats or snacks for class (optional: has no impact on grade)

**Grading:**

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| --- | --- |
| Presentation | 60% |
| References/Summaries | 15% |
| Presentation Outline | 10% |
| Class Evaluation | 15% |

**Schedule:**

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| --- | --- |
| **Date** | **Due** |
| 11/8 | Topic and names of group members |
| 11/20 | List of references/summaries |
| 11/22 | Sign-up for presentation time |
| 11/25 | Presentation Outlines/ 3 MC questions for the final exam |
| 12/2,4,6 | Class Presentations |

**More details:**

This project is worth 15% of your grade (same as an exam). The grade you get on this project will be directly determined by the effort you put into this project. Since you are mature, responsible adults, I am going to assume that the work load will be evenly distributed among group members. *Have fun exploring number theory*! I am excited to see what you guys will learn through this process.

One more note: I consider the week of presentations to be just as much of a learning experience as any other week. The only difference is that you will be the ones teaching instead of me. You will still need to be in class and paying attention (and even taking notes) every day while groups are presenting. You will be evaluating each presentation, and you will also be accountable for the material presented. ***On the final exam I will ask a question from each of the presentations.***