

# 2021 UChicago Math REU Notes

Steven Labalme

June 22, 2021

# Weeks

<b>1</b>		<b>1</b>
1.1	Introduction to the Program (May / Rudenko) . . . . .	1

# Week 1

## 1.1 Introduction to the Program (May / Rudenko)

- 6/21:
- Mainly given by Peter May.
  - A far broader range of mathematics than any other REU.
  - Things you have to do:
    1. Soak up as much mathematics as you can.
    2. Work with a mentor to write a paper.
      - You can work with people to write a joint paper?
      - This is fairly unique to this REU.
    3. Meet with your mentors at least twice a week.
  - Don't be shy and unwilling to ask questions.
  - Daniil Rudenko is in charge of the apprentice program.
  - Apprentice program:
    - An opportunity particularly early in one's mathematical career to explore mathematics.
    - Asynchronous video lectures.
      - Feel free to share with friends.
    - Problem solving.
      - Problems that are not merely exercises but more difficult, interesting processes.
      - Spend a couple hours a day thinking about these problems.
  - Emphasis on relations between different subjects.
  - They will be organizing social activities.
  - Social meet and greet at 6:00 PM tonight.
  - Breakout rooms:
    1. Apprentice Program.
    2. Probability.
    3. Analysis and Dynamical Systems.
    4. Algebraic Topics.
    5. Main room: Algebraic Topology.
  - More on the apprentice program:

- Daniil wants us to see much more than classical analysis/calculus. He doesn't see dividing lines between fields of mathematics.
- Bijections, binomial coefficients, Catalan numbers, etc. to start.
- Group of permutations, group of isometries of the plane, what a group is, etc.
- We can solve problems individually or in groups.
  - Some problems will say not to collaborate.
- Don't try to solve every problem. Don't try to solve everything fast; it's fine if you fail, if you just think about something for a couple hours that's interesting and don't get everywhere.
- On campus classes option for participants in Chicago.
- This week 10-11 AM Wed/Fri?
- Office hours 10-11 AM on Thursday.
- He will send an email with more information.
- Be consistent in whether you want to be on or off campus.
- You may attend whatever you want, but be careful: The apprentice program is your priority, so don't spend too much time on the other stuff.
  - Follow Piazza groups to get links.
- $\text{\LaTeX}$  one solution each week.