

Math 2222/6222– Introduction to Mathematical Thinking (2017)

Course Information Sheet

The goal of this course is to give you experience in developing, writing, and explaining mathematical proofs. You will practice these skills each week by writing up solutions to a range of interesting problems in combinatorics, probability theory, and number theory. Why should you care about writing mathematical proofs? Because it trains you to think and express yourself clearly, to see into the depths of things, and to distinguish radiant truth from wicked falsehood.

1. LECTURES

Monday	12–1	Psych G6
Thursday	2–3	RS Chem T
Friday	1–2	Psych G6

2. MY CONTACT INFO AND OFFICE HOURS

David Smyth	Office Hours:
John Dedham MSB 2146	Monday 3:00-4:00
Phone: x54233	
E-mail: david.smyth@anu.edu.au	

Please come talk to me! Questions of any kind (even questions that are not yet well-formed) are most welcome. If you cannot make my scheduled office hours, please feel free to drop me an e-mail. Alternatively, just drop my office – I may not be around and I may not be free, but if I am I'll be happy to chat.

3. TEXT

The official textbook for the course is *Mathematical Thinking: Problem-Solving and Proofs* by Douglas West and John D'Angelo. I will occasionally assign readings from the textbook, so you will probably want to own a copy. I'll also keep a copy in Hancock Library on reserve.

4. HOMEWORK

There will be weekly homework assignments to help you stay engaged with the material. These will usually be assigned on Friday and due the following Friday. Late assignments will not be accepted under any circumstances. On the other hand, your lowest homework grade from the semester will not count toward your final grade.

You are absolutely encouraged to work on the homework assignments together. Mathematics is about sharing ideas and it is difficult to practice that skill in social isolation. On the other hand, mathematics is also about developing your own personal understanding of the material, and it is difficult to do that without some quiet, focused concentration. Thus, I strongly encourage you to attempt the problems on your own each week and see where you get stuck before moving to a group setting. You must write up your own solutions in your own words. Direct copying of others' work does not lead to insight or understanding, and is therefore *forbidden*.

5. EVALUATION

Your homework is worth 50% of the final mark. There will also be a midterm and final exam, worth 20% and 30% of the final mark, respectively. These will be standard sit-down exams, no notes, no textbook, etc.

6. TOPICS

I plan to cover the following topics, though this may change a bit depending on interests of the class.

1. Numbers, Sets, and Functions
2. Induction
3. Bijections and Cardinality
4. Inclusion-Exclusion and Pigeonhole Principle
5. Divisibility and Modular Arithmetic
6. Probability
7. Graph Theory