



BOSTON COLLEGE

MATH 1007: Ideas in Mathematics (3 credits) Fall 2019

Section 01 MWF 9:00am Gasson Hall 309
Section 02 MWF 10:00am Gasson Hall 309

Professor

Patrick Orson

Office: Maloney 564

Office hours: Mon 1.00-2.00, Wed 11.30-12.30, Thu 3.00-4.00, or by appointment

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Course description: The study of mathematics is one of the oldest human endeavours and through it we can enjoy beautiful and exciting concepts, some highly applicable and some entirely abstract. In this course we will explore a variety of conceptually fascinating and historically significant ideas from various branches of mathematics, including (but not limited to) prime numbers and cryptography, 'rubber sheet' geometry, graph theory, and a glimpse at infinity. Always with an emphasis on intellectual exploration, we will discuss these landmark ideas, posing and answering our own problems along the way. This is not a computationally intensive class, but you should expect to be intellectually pushed as you grapple with these exciting ideas. Maths is about learning by doing! So in this course you will become practised in describing and explaining mathematical ideas as you explore them, as well as solving conceptual puzzles that will give rise to important and elegant theories.

Prerequisites: None.

Course website: The course website is on Canvas (access through Agora or at <http://bc.edu/lms>). Canvas will be used to post all course materials except the textbook: up-to-date syllabus, homework assignments, lecture notes, quizzes, exam preparation materials, and more. **Please check Canvas regularly.**

Textbook: *The Heart of Mathematics* 4th Edition, by Burger and Starbird. The book is not just for problems and homework – it was chosen as a very readable guide to the ideas we are exploring. You should read along with the chapters in the textbook material as we cover the subject in class. (But note that the textbook is huge so we certainly won't cover it all.)

Technology and classroom etiquette: In the classroom, please respect the other students by arriving on time and engaging in the class once you are there. Asking questions whenever you like in class is highly encouraged! This class is not intended to be a series of dry facts you absorb, but rather an exploration of ideas. If you have thoughts on something you see, or are curious about something I say, then please stop me and ask. It will be more fun for all concerned. There are no bad questions or wrong questions.

Phones may be used to take pictures of the board, but please do not take a video or use your phone in any other way during class without my permission. Laptops or tablets are not to be used during class unless you can convince me you have a good reason – for example you are using them to take notes, or you have a documented disability that requires their use. You are welcome to use calculators for homeworks. There will be no calculators permitted in exams or midterms (they wouldn't be too much help anyway). Using technology in an unapproved way in class may affect your participation grade.

- **Grade assignment**

Participation 5%	Midterm 1 20%
Quizzes 5%	Midterm 2 20%
Homework 20%	Final exam 30%

After the final exam, your (raw, uncurved) numerical scores will be combined according to the above weights to make a number between 0 and 100. This number will be used to determine your final letter grade, according to departmental guidelines. Unless there are exceptional circumstances, I won't curve any homework or exam score as we go along. I will simply do one big curve at the end.

- **Makeup Exams:** Unexcused absence from an exam will result in a zero score for the exam. If you have a planned, legitimate reason for missing an exam, you must make arrangements with me to take the exam *before* the scheduled time of the exam. **If you are sick the day of the exam, or have a family emergency, etc., you need to go to Health Services or your Dean's office and obtain documentation of your legitimate reason for missing the exam.**

Booking travel that clashes with exams is **NOT** a legitimate reason. Be careful!

Attendance: Please come to classes. The occasional absence won't harm your participation grade, but repeated absence may affect your participation grade. If something out of your control happens that means you have to miss a lot of classes, you need to contact both me and your Dean about it as soon as possible. Your Dean will be able to provide me with documentation and advice on accommodations I can make for you. Without a legitimate reason, a significant number of noted absences will harm your participation grade, not to mention your performance in midterms, quizzes, etc.

If you miss a class, it is your responsibility to find out what you missed by asking for notes from another student or checking the Canvas page for the notes from class.

Academic integrity: Working together with your friends can be the most fun way to do mathematics – I encourage you to discuss ideas and homeworks with your friends and peers. However, **you must write up your homework/quiz solutions by yourself in your own words. No copying from someone else's work or otherwise copying, transcribing, paraphrasing etc. from any source.** Submitting work that is not your own, or otherwise violating academic integrity on a homework or quiz, will mean you immediately receive a zero score for that homework or quiz. A good rule of thumb: don't turn in a solution you don't personally understand; if you need your friend to be in the room with you for the write-up, you are probably copying. There is a big difference between sharing your ideas and letting someone else copy your work, and latter is also considered a violation of academic integrity. **Cheating on a midterm or final will result in a failing grade for the course.** I take the violation of academic integrity very seriously, and ultimately the person who suffers most is you – read more about this at <http://www.bc.edu/offices/stserv/academic/integrity.html>.

If you are having a lot of difficulty finishing the homeworks in time, please come and talk to me about it! We can work out a plan to help you. Resorting to violating academic integrity is not a good short- or long-term solution when you are having a tough time.

Religious observances: Boston College is supportive of the religious practices of its students, faculty, and staff. The university is committed to ensuring that all students are able to observe their religious beliefs without academic penalty. If you observe a religious holiday that will impact your work in this course, please see me at the beginning of the semester. We will then work to find a reasonable accommodation that will allow you to complete the academic work.

Special accommodations: If you are a student with a documented disability seeking reasonable accommodations in this course, please contact Kathy Duggan, (617) 552-8093, dugganka@bc.edu

bc.edu, at the Connors Family Learning Center (CFLC) regarding learning disabilities and ADHD, or the Disability Services Office (DSO) regarding all other types of disabilities, including temporary disabilities. Advance notice and appropriate documentation are required for accommodations, and it is your responsibility to obtain this from the CFLC or the DSO, as appropriate.

Other resources: Outside of my office hours and help from your peers, the Mathematics Department sponsors free drop-in tutoring in Maloney 560. Listen for an announcement early in the semester about the schedule of hours. No appointment is necessary. In addition, the Connors Family Learning Center (in O'Neill Library) offers free tutoring in various subjects at various times. Call them at (617) 552-0611 for more information or to set up an appointment.

Sexual misconduct / Title IX: Boston College prohibits and will not tolerate sexual misconduct or gender-based discrimination of any kind. Boston College is legally obligated to investigate sexual misconduct (including, but not limited to sexual assault and sexual harassment). Students should be aware that most faculty members, with some exceptions, are considered responsible employees; as such, if you disclose an incident of sexual misconduct to a faculty member, they have an obligation to report it to Boston College's Title IX Coordinator, who will follow up on the report. All actions will be handled discretely. Disclosure may include communication in-person, via email/phone/text, or through class assignments.

To learn more about sexual misconduct or report an incident, visit:

<https://www.bc.edu/offices/diversity/compliance/TitleIX.html>

Common questions:

- **What are office hours and how do I use them?**

Office hours are time that I set aside to sit in my office and wait for you to come and ask me questions. You can ask me questions about ideas from class, or about questions you are stuck on in the homework, or anything else class-related.

You don't have to make an appointment to come, you can just turn up. It's not a class, so I won't have anything specific prepared to say to you – this is your time to ask me things. It's good to come with a couple of questions you have already thought about, but it's also fine to just turn up and absorb the discussion. If a session gets busy, I will usually try and talk to the group as a whole, answering questions on a first-come-first-serve basis. Often people will have similar questions, so even if you were not the first to arrive, the chances are the group will be discussing the thing you were interested in anyway.

- **How do I do really well in this class?**

Make sure you are coming to class and engaging with what we are talking about. Get curious. Ask questions in class. You should expect to spend **two hours working out of class for every one hour you spend in class**. Read the textbook along with the material we are covering in class. Get on top of homework and start it early; this gives you time to discover any difficulties and come to office hours for a discussion, avoiding last-minute disasters! Your classmates are a resource – chat with your friends about homework. Chat with me about homework. If you work hard on homework throughout the semester, then when you study for the midterms and final it will seem much easier.

The classes, homework, quizzes, office hours, and exams are designed to work together to help you master the material. Sections of the material will be cumulative, so concerted effort over a period of time is the only way to do well. If you miss some material, and you don't try to catch up, this will probably come back to bite you in at least one midterm and also the final. So be responsible for any gaps in your knowledge.

If you don't come to class regularly, or you don't complete the homework regularly, etc., you will probably fall behind. If you are worried you are falling behind or having any other kind of difficulty, please let me know as soon as possible so I can try to help.

- **What's my grade right now?**

I can remind you of your current numerical scores and give you a very rough idea of how you are doing relative to the rest of the class. But this is the most detailed information I will be able to give – I won't be able to tell you exactly what score you need on the midterms/final/etc. to make X grade.

- **How do you curve grades?** In the spirit of maximal transparency, I try to give you an idea of this process after each midterm. I will announce approximately which numerical scores would hypothetically correspond to an A, B, etc. in that midterm. This will give you an accurate idea of how I approach grade assignment and also help you interpret your midterm score relative to the rest of the class. (I emphasise that this is not a letter grade assignment, it is only hypothetical; individual homeworks/exams/quizzes are not curved. There is just one curve that occurs after the final exam. See “grade assignment”, above.)

- **I think I lost too many points on my quiz/homework/midterm/final. Can you give me some back?**

I'm always happy to explain mistakes and discuss mathematics, but unless there was an actual error in grading or totalling I cannot give you more points. One important thing to remember is that all the other papers were graded exactly the same way.

- **I want to discuss something confidentially, what should I do?**

If you need to discuss something private, please email me and we can set up an appointment.

You made it to the end!

Now follow the link to

Homework 0: <https://forms.gle/RtWHR5bx1GBNk6Zw7>