

Math 135 Lecture 1

Carmen Bruni

University of Waterloo

September 14, 2015

Say Hello

Meet and greet your neighbour! Who knows, they could turn out to be your best friend or in your wedding party someday. Possibly topics to discuss: Course schedule, program, favourite sport/game, an odd hobby, favourite mathematical concept, etc.

- Website: www.cemc.uwaterloo.ca/~cbruni (Not yet googlable!)
- Background
- Office MC 6227
- Email: cbruni@uwaterloo.ca

- Morning, Afternoon?
- Assignments are due Wednesdays; Office hours probably on Monday, Thursday and Fridays?
- Proposal: M,Th at 1:00-2:00 and F at 10:00am.
- Can always email for an appointment or just try to find me. If I'm around and have time I can meet.

Tips for Surviving 1A

Tips for Surviving 1A

- Eat well, sleep right and exercise. Surviving is harder when you are unhealthy!
- Fix holes in your knowledge today. If there is something you don't understand, today is the day to fix that! You will never have a better opportunity to correct mistakes and overcome fears than today.
- Start early! (Assignments, studying, etc.) Don't fall behind!
- **Go to class!**
- Brace yourself for failure (not in a course necessarily, but expect problems you will have difficulty solving).
- Watching a swimmer doesn't make me a good swimmer anymore than watching me to mathematics makes you a good mathematician.
- Remember - by virtue of you hearing my voice, it means that you are fully capable and can succeed here.
- Find help (More on next slide).

Options for Help

- Me! Office hours (preferred) or by appointment.
- Friends! (Discuss cheating and how to avoid it.)
- Piazza, our online forum www.piazza.com
- LEARN (Uwaterloo link for resources)
- My webpage.

Assessment and Assignments

- 60% Final Exam 30% Midterm 10% Assignments (11 total assignments best 10 count).
- Assignments will be due on Wednesdays EXCEPT for Assignment 0 which is due this Friday.
- Midterm exam is Monday October 19th.
- Final exam is sometime during the final exam period. Information on this will appear later.

Assessment and Assignments

- Crowdmark for all assignments. (A link will be emailed to you)
- **Action items:** Make sure you log onto your uwaterloo email account and AT LEAST set up mail forwarding. Make sure you get your Crowdmark email for assignment 1.
- DO NOT SHARE Crowdmark links. They are unique to the person so using your friend's email will make their submission count for their score and not yours.
- You are responsible for good scans of your documents. Either buy a scanner, use MATHSOC, take pictures using a phone app (More on this in assignment 0) take pictures using your webcam etc. But again it is YOUR responsibility to ensure that the scans (and your work) is legible. Illegible submissions will not be marked and will not be offered any recourse.
- No late assignments will be accepted. Log on and submit early and often to Crowdmark. "My internet crashed 5 minutes before the assignment was due" is **NOT** an acceptable excuse.

These are some tips on some extra things you should learn throughout your university career. No one will tell you explicitly to but at some point, everyone will just assume you've learnt these things.

- Learn a programming language. I strongly recommend the combination of Python and Sage.
- Learn how to LaTeX, that is, how to type math properly into a computer.

- Welcome to your first math course!
- What is a proof? The difference between science and mathematics.

A Question at a Party

Suppose 6 people gather in a room. Must there always be a group of 3 people that are either all friends or all strangers?

A Short Proof

Pick a person and we'll call him Bob. Then no matter what there are three people this person is friends with or three people that this person is a stranger to since there are five other people (this is called the Pigeonhole Principle). Let's assume we are in the friends case since the strangers case is symmetric. With these three friends, notice that if any two are friends then we are done since they form a group of three friends with Bob. Otherwise, they are all strangers and so they themselves must form a group of three strangers. This completes the argument.

A More Mathematical Example

Is there a positive integer n such that $n^2 + 1$ is also a square?

Another Short Proof

Since $n^2 < n^2 + 1 < n^2 + 2n + 1 = (n + 1)^2$ and there are no positive integer squares between n^2 and $(n + 1)^2$, the answer is no.

Another Short Proof

Since $n^2 < n^2 + 1 < n^2 + 2n + 1 = (n + 1)^2$ and there are no positive integer squares between n^2 and $(n + 1)^2$, the answer is no.

Notice that some proofs contain all words, some use algebra. A proof should be a convincing argument of a statement. A proof requires at least two people, a creator and an observer.

Throughout this course you should assume that the observer is a *typical Math 135 student* (and not a mathematical professor!)