MATH 1200 section B - Problems, Conjectures, Proofs	Professor: Mike Zabrocki email: zabrocki@mathstat.yorku.ca Office: TEL 2028 Office hours: TBA Textbook: Mathematical Proofs: A transition to advanced mathematics, by Chartrand, Polimeni, Zhang As a alternate/optional textbook: Thinking Mathematically, by Mason, Burton, Stacey

Course Description: Students entering a university level mathematics program often lack the experience to deal with questions and problems when there is no obvious method to apply. One purpose of this course is to enable students to develop the confidence and ability to attack richer and more demanding problems. The attempt to check work and to explain one's discoveries to others leads naturally to the need for explanation and proof. Learning how to present convincing reasoning - or proof - is another course outcome. This course is about thinking and about communicating.

To do well in upper division courses at York, students will need to be proficient in these types of skills and Math 1200 is a required first year course to help students succeed in their later courses. Class and tutorial attendance is mandatory and active participation is expected of all students.

The course textbook will be Mathematical Proofs: A Transition to Advanced Mathematics. The text is useful because it has lots of examples and problems. We will be covering Chapters 2-7 and occasionally digress in to subjects that appear in the other chapters. We will also be working with the most recent edition of J. Mason, L. Burton, and K. Stacey, Thinking Mathematically (Prentice Hall). The problems in this book are easily accessible while at the same time allowing for rich and varied investigations.

With an emphasis on communication/convincing argument, there is a critical contribution to be made by: group work, reading a proposed 'proof' including other student's work, presenting and discussing as a whole class. There is also value in working through several different approaches to solve a problem, and taking the time to understand an alternative approach offered by a peer in the class. Doing mathematics well includes talking and listening to mathematics and there will be assignments that require collaborative work with another student in the class, as well as support for forming study groups.

Prerequisite: 12U Advanced Functions and Introductory Calculus or equivalent.

Evaluation:

The evaluation will be based on the following criteria

Participation	based on attendance and in class assignments	
Assignments	roughly one every 4 weeks	20%
Tutorial writeups	see below	25%
Quizzes	6 total, 3 per term, best 2 from each term	25%
Final Examination	Winter exam period	30%

Do your own work. Don't look for a solution on the web or take one from another student's work unless you already have found your own solution and intend to review another to make a comparison. Work that is not original will be graded accordingly. Presenting someone else's work as your own without proper citation is academic dishonesty. You must cite any internet sources which you have consulted. You will be required to take the York University Academic Integrity Tutorial.

Participation: You are expected to show your commitment to this course and your fellow students by sharing your mathematical knowledge and your feelings about the material. Attendance at the weekly classes and the tutorials is obligatory and you will lose 2 points from your course grade for each class or tutorial that you miss each term. Sometimes attendance at the weekly classes will be measured by a short in class assignment. Non participation in these assignments will result in a lowering of your participation grade. Note that participation is not a percentage of your grade, but non-participation and attendance can lower your overall score.

Assignments: There will be roughly one assignment 4-5 weeks. Most assignments will require explanation beyond a simple one or two word/numerical answer. It is good practice to RECOPY THE QUESTION EVERY SINGLE TIME when you do the assignment. This makes it possible to understand what the assignment when it is handed back to you and it attempts to reduce the error of answering a different question than is on the assignment. Full credit is given

to papers which demonstrate deep understanding of the problem by providing multiple solutions and considers variations based on the original question when this is appropriate. Your assignment should include complete sentences and explanations and not just a few equations or numbers. A solution will not receive full credit unless you explain what your answer represents and where it came from. You may discuss the homework with other students in the class, but please write your own solutions.

Note: Late assignments will be penalized by 20% per day. This will apply to any homework handed in after the class time in which it is due. In addition, assignments which are handed in late are unlikely to be marked in a timely manner.

Tutorial Assignments: You are expected to continue working on the problems discussed in class and in the tutorials and to keep a running record of the problems from those exercises (these will be listed on the web page) as well as your progress and the development of a solution for them. Here is a breakdown of some aspects that I plan to evaluate your solutions from the tutorial:
(1) The discussion begins with an explanation of the problem
(2) The explanation should convince the reader that the meaning of the question is understood (e.g. small examples, a clearly labeled table of data, and/or a discussion of the meaning of the question)
(3) diagrams, tables or images that are drawn to aid the reader in understanding the problem are well labeled and explained
(4) Clear statements are made of conjectures that are believed to be true
(5) Explanations of why those conjectures are true are included
(6) An explanation of how the problem solving process proceeded is clear from the explanation
(7) The entries consist of writing which is clear and grammatically correct
(8) A conclusion about the solution to the problem is reached

On both your journals and assignments, I will be looking for evidence of your solutions demonstrating one of the following 4 levels of understanding:
Level 4: Deep understanding of the problem. Complete solution carefully presented. Provides multiple alternative solutions where possible. Considers variations based on the original question (with or without solutions).
Level 3: Good understanding of the problem. Problem solved or a solution provided which can easily be completed, for example, one with a minor error which would be simple to correct. No evidence of engagement beyond finding an answer to the problem as posed.
Level 2: Incomplete understanding of the problem. Limited progress to solution or a solution marred by major errors.
Level 1: Minimal understanding of the problem. Work submitted shows little progress toward solution.

Note that to receive full credit you must go beyond simply solving the problem as posed. Learn to think of your solutions as a starting point.

Quizzes and Final Examination: There will be 3 quizzes per term (dates listed below). A final examination will be scheduled for the April exam period and the date announced in late-February/early March.

Those that would like to review some concepts that you are expected to have from high school, there are a few online references I can recommend to start: (1) There is a quite extensive set of algebra tutorials, covering a wide range of topics, maintained by West Texas A&M University. The URL for the main page of this resource is http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra though a quicker way to get to this page is via the link on the Bethune College Math Help page, http://www.yorku.ca/bethune/math
(2) There is also a detailed online course in Trig basics, which starts right from the beginning, the URL for the main page of the course being http://www.yorku.ca/bethune/math/trig.html (as you can guess from this URL, the Bethune Math Help page has a link which takes you to the Trig course main page). Other potentially useful information is also listed on the Bethune Math Help web page, and further online resources will be added there as they become available.

In the Fall the lectures will meet: Sept 12, 19, 26, Oct 3, 17, 24, 31, Nov 7, 14, 21, 28, Dec 5
The tutorials will run each of these evenings starting September 19.

In the Winter the lectures will meet: Jan 9, 16, 23, 30, Feb 6, 13, 27, March 5, 12, 19, 26, Apr 2.

Quizzes will take place on Oct 3, Nov 7, Dec 5, Jan 30, Mar 5, Apr 2.