Homework Assignment 11

Assigned Tuesday November 23; not to be submitted.

Required reading. All of Spivak's Chapters 11 and 12.

Recommended for extra practice. From Spivak Chapter 11: Problems 48, 52, 63. From Spivak Chapter 12: Problems 1, 5, 8, 11, 18, 23.
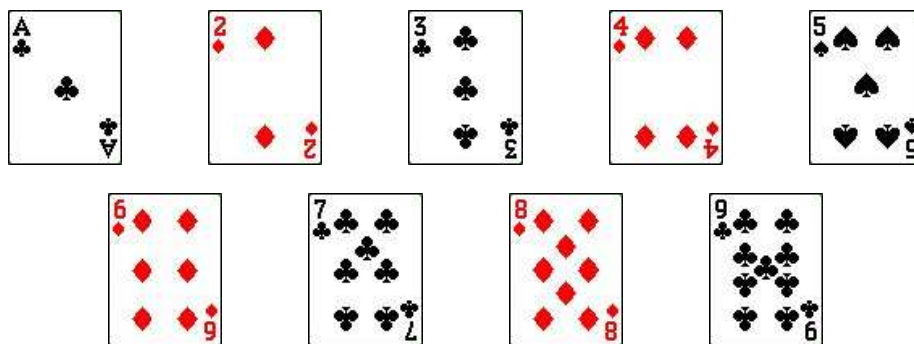
On Term Exam 2. It will take place, as scheduled, during the tutorials on Monday November 29th. You will have an hour and 50 minutes to solve around 5 questions, with no choice questions. The material is everything covered in class until Tuesday November 23rd (though not including Thursday November 25th), including everything in the relevant chapters (6–11) of Spivak's book (though not including the appendices to these chapters, except for the appendix on convexity which is included precisely to the extent that it was discussed in class). The material in chapters 1-5 is not officially included, though, of course, what chance have you got answering questions about derivatives (say), if you aren't yet absolutely fluent with limits? Some questions will be taken straight from class, some straight from homework, and some will be fresh. Calculators will be allowed but will not be useful beyond emotional support; no devices that can display text will be allowed. Good luck!

Preparing for Term Exam 2.

- Re-read your notes and make sure that you understand *everything*.

- Re-read Spivak's chapters 6–11 and make sure that you understand *everything*.

- You may want to prepare a list of all topics touched in class (you may reach 50 or even 100), and you may want to go over this list several times until you are sure you understand everything in full.

- Make sure that you can solve every homework problem assigned or recommended.

- Take a good look at exams, sample exams and exam solutions from previous years. (Scroll down to the bottom of this class' web site and find the relevant links).

- Read the Math 137 page on "How to Solve Problems" (though remember that if there really was a problem solving methodology that *always* works, mathematicians would have been a mere technique rather than an art or a science).

- Come to my office hours Friday 3-5, at the Math Aid Centre, SS 1071.

- It is much more fun to work in a group!

An often-asked question is "Do we need to know proofs?". The answer is **Absolutely**. Proofs are often the deepest form of understanding, and hence they are largely what this class is about. The ones I show in class are precisely those that I think are the most important ones, thus they are the ones you **definitely** need to know.

Just for fun. The game of 15 is played as follows. Two players alternate choosing cards numbered between 1 and 9, with repetitions forbidden, so the game ends at most after 9 moves (or $4\frac{1}{2}$ rounds). The first player to have within her/his cards a set of precisely 3 cards that add up to 15 wins.

Does this game has a winning strategy? What is it? Who wins, the first to move or the second?

I heard this problem from a student in my other class, Jacob Tsimerman; he heard from a former UofT student, Ravi Vakil, who heard it from Eric Mendelsohn. It may have a longer history, though. (The cards are from http://www.jfitz.com/cards/).