Math 3592H   **Feedback Sheet**   **9/5/2017**

I want to get a more precise idea of your mathematical background than what I have at the moment. Please look at each of the following questions. Do **not** actually do any of the questions or even spend much time thinking about them. Instead, circle none, one or two of the possibilities which follow the question, which are:

         Have seen this before   Can probably do it   Can't do it

Also, I am not asking whether you have seen *exactly* that problem before, but whether you have seen that kind of thing.

When you have finished circling the appropriate statements, you may want to discuss the problems in your class and with your TA. At the end of the recitation, please **hand this sheet to your TA**, so that I can see your responses.

Peter Webb

(A) Let $f(x)$ be a function of a variable x. Which (if any) of the following means the same thing as '$f(x)$ tends to a limit L as x tends to a'?

  (1) There is a number $\epsilon > 0$ for which there exists a number $\delta > 0$ so that $|f(x)-L| < \epsilon$ for every x with $0 < |x - a| < \delta$.

  (2) For each $\epsilon > 0$ there exists a number $\delta > 0$ so that $|f(x) - L| < \epsilon$ for some x with $0 < |x - a| < \delta$.

         Have seen this before   Can probably do it   Can't do it

(B) Prove, by contradiction, that, if n is an integer and n^2 is even, then n is even.

         Have seen this before   Can probably do it   Can't do it

(C) Prove using induction on n that $\sum_{i=1}^{n} i = n(n + 1)/2$.

         Have seen this before   Can probably do it   Can't do it

(D) Evaluate $\int_0^1 xe^x \, dx$.

         Have seen this before   Can probably do it   Can't do it

(E) Evaluate $\int_0^1 \frac{dx}{(x+1)(x+2)}$.

         Have seen this before   Can probably do it   Can't do it

(F) Find an explicit expression for $\sum_{r=1}^{N}(r^2 - r)$

(in the same way that, for example, $\sum_{r=1}^{N}(3r^2 - 2r) = \frac{N(N+1)(2N-1)}{2}$).

         Have seen this before   Can probably do it   Can't do it

(G) Find the limit (if it exists) of the sequence of complex numbers $\frac{1}{(1+i)^n}$.

         Have seen this before   Can probably do it   Can't do it

(H) Determine whether or not the following series converges: $\sum_{n=1}^{\infty} \frac{n+3}{n^3+5n-1}$.

         Have seen this before   Can probably do it   Can't do it

(I) If you wish, write 2 or 3 sentences on the back to give me an idea of where you are mathematically. It is optional to tell me your name. What course have you taken before? Have you written proofs of things before? Anything else?