MATH 6670, REVISIONS

DUE FRIDAY, MAY 17

1. (Revisions) If there is an assignment that you did not get perfect credit on, but would like to revise, please feel free to resubmit them via the following process:

What I would like you to do is the following:

(a) Go through your old homeworks.
(b) Find problems that you attempted, but did not get full credit on.
(c) Paste in your old work.
(d) Write a paragraph explaining why your old attempt didn't work, your proof was flawed, etc.
(e) Fix your problem by attaching a new and correct solution.

The due date for revisions will be **Friday, May 17.** We will give partial credit for correct answers when calculating the final grades.

Here is an example of how the format should be.

Homework 32.1(b) There are infinitely many prime numbers. In other words, Spec $\mathbf{Z}$ is infinite as a set.

Old proof that didn't work: 2 is a prime, 3 is a prime, 5 is a prime, 7 is a prime... it seems to be true. I can't see why it shouldn't be true.

Reasons that the old proof does not work: I only gave four examples of prime numbers, and this doesn't prove that there are infinitely many primes.

New proof. We proceed by contradiction. Suppose that there were only finitely many primes; we take all of them and label them $p_1, p_2, \ldots, p_n$. Consider the product $Q = \prod_{i=1}^n p_i$ and note that Q is divisible by every prime number p_i. Since Q is a natural number, it has a unique factorization into primes. However, $Q + 1$ is not a multiple of any of the p_i's, because p_i divides $(Q + 1) - 1$. Thus, $Q + 1$ must itself be a prime number. However, $Q + 1 > p_i$ for any prime p_i in our list of primes, so our initial list of primes did not contain all the prime numbers, which is a contradiction. □