Mathematics 375 – Probability and Statistics 1
Problem Set 5
due: October 22, 2003

I. The Maple package for our class now contains a procedure that can be used to generate any number of samples from a given hypergeometric distribution. *Note: I just added this on Monday, October 13, so you will need to download the package again to get a version including this new procedure.* After you have loaded the package, if you enter a command of the form:

```
HypergeometricSample(N,n,r,Num);
```

you will generate `Num` values of a hypergeometric random variable with parameters: N = total population, n = sample size, r = number of "type a" individuals in the total population. A second command:

```
HypergeometricPDF(N,n,r,y);
```

computes the values of the hypergeometric pdf with N, n, r as above, and y = number of "type a's" in the sample of size n.

A) An electronic device contains 15 components, of which 4 are defective. 5 components are selected at random and tested. Simulate the testing process using the `HypergeometricS` procedure three times, with tt Num = 10, then 100, then 1000. (Note: This means 10 random selections of 5 components to test, then 100, then 1000.) Compute the frequencies of the different numbers of defectives observed and illustrate with frequency histograms using 5 "bins" centered at 0,1,2,3,4 to match the usual set-up for a probability histogram. What happens as `Num` increases?

B) Using the Maple procedures described above, compute the theoretical probabilities that $0, 1, 2, 3, 4$ defective components are found among those tested. How do your results from part A compare to the theoretical values in this part?

From the text: 3.85,86,87,89,95,97,98,99,100,111,114,117,118,121,126.