Homework 3
Due Friday, September 20

Individual Problems:

1. (4.2.1) A typist averages one misspelling in every 3250 words. What are the chances that a 6000 word report is free of all such errors? Answer the question in two ways: first, by using an exact binomial analysis, second by using a Poisson approximation.

2. Suppose the city bus arrives at a given stop at random times, but that the average time between busses is half an hour. What is the probability that if you arrive at the bus stop just as one bus is pulling away, you will need to wait more than half an hour for the next bus?

3. (Example 4.3.1) Concert organizers know that not everyone who buys a ticket will show up. Accordingly, they sell 220 tickets for a concert hall that holds only 200 people. What is the probability that more people show up than can be accommodated?

Group Problems:

1. (Example 4.2.4) Suppose that the average number of bug parts per 100 grams of food is 20. Suppose you spread 10 grams of peanut butter on your bagel. What are the chances that your bagel will contain parts from fewer than 4 different bugs?

2. (Example 4.4.2) Suppose MacDonalds offers three different kinds of Happy Meal toys. The toy that shows up in your happy meal is random. What is the expected number of happy meals you need to buy in order to collect all three toys?

3. (4.5.1) Suppose your bran muffins have a 20% chance of rising. What are the chances that you need to make fewer than 5 batches in order to achieve 2 successes?

4. (Theorem 4.6.2) Complete the proof that \( \Gamma(r) = \int_0^\infty y^{r-1}e^{-y}dy. \)