Homework # 2
Due 2/18

1. Reading: Sections 2.1-2.4. (Section 2.4 covers variance, which I did not get to in the lecture. Be sure to read and understand this portion of the section.)

2. Exercises: 2.12, 2.24, 2.26, 2.38, 2.39

3. (a) Let X be a binomial r.v. with n trials and success probability μ/n. Let Y be a Poisson r.v. with mean μ. Show,

$$\lim_{n\to\infty} P(X = k) = P(Y = k) \tag{1}$$

   (The book goes through this if you get stuck, see (2.20).)

   (b) Suppose that the probability you receive an email in any particular minute is 0.01. Suppose further that if $f \in [0, 1]$, then the probability that you receive an email during a fraction f of a minute is $0.01f$. Use part (a) to compute the probability that you receive 20 emails in a given day, the expected number of emails you receive in a day (exercise 2.39 above will be helpful for this), and the number of received emails in a day with the highest probability.

4. Problems: 3, 4, 5, 6 (this problem shows how to compute expectation using $P(X > n)$ rather than $P(X = n)$, which is useful because sometimes $P(X > n)$ is easier to compute than $P(X = n)$), 9.