Reading. Read sections 3.7–3.8. We will discuss section 3.7 in detail in class on Monday.

Practice Problems. Work out the solutions to the following problems in a notebook and check your answers in the back of your text book. YOU WILL NOT TURN THESE PROBLEMS IN for a grade. They are only to help you study. Note however that these problems may appear verbatim on the weekly tests.

3.70–3.74

Homework to turn in Monday, July 27 (at the start of class)

1. From a box containing five white and four red balls, three balls are selected at random without replacement. Find the probabilities of the following events: (10 points)
   (a) Exactly one white ball is selected.
   (b) At least one white ball is selected.
   (c) Two white balls are selected given that at least one white ball is selected.
   (d) The second ball drawn is white.

2. Let $X$ be the random variable indicating the amount of money won on a game of chance. The game is called “fair” if $E(X) = 0$. Consider the following game. The player pays the house $a$ dollars each time he wants to play the game. After paying the $a$ dollars, the player picks three distinct numbers from 1–10. The house randomly chooses three distinct numbers from 1–10 by drawing balls numbered 1–10 out of a bin without replacement. The house then pays the player $1 for each of the player’s numbers that match one of the randomly drawn numbers. So for example, if the player has two matching numbers, the house will pay the player $2 and the player’s net profit will be $2 − a$ dollars. What should $a$ be in order that this game be fair?

3. A warehouse contains 25 machines, four of which are defective. Suppose a company randomly chooses six of the 25 machines. Suppose each non-defective machine costs the company $50 and each defective machine costs the company $120. (a) What is the expected cost and standard deviation? (b) Use Tchebysheff to determine a range of costs that will happen at least 90% of the time.

4. Suppose you have 100 bags of M&M candies, of which 40 are peanut M&M’s and 60 are plain M&M’s. If you randomly choose 20 bags (without replacement) from the 100, what is the probability that you have between 5 and 12 bags of peanut M&M’s. Hint: This problem is easiest to do with a cumulative distribution function for the hypergeometric distribution. Unfortunately, your book does not have tables for hypergeometric distributions, and the cumulative distribution function for hypergeometric distributions is not built into most calculators or Excel. There are some online web calculators though. For example, the websites:

   http://stattrek.com/Tables/Hypergeometric.aspx

allow you to easily compute the values of the cumulative distribution function for the hypergeometric distribution.