Statistics 1: Sections 4 and 6, Fall 2008
Practice Problems for Exam 2

Note: This is not a comprehensive list of the types of problems for the exam. Be sure to review all of sections 4.7, 4.8, 5.2, and the parts of 6.1-6.3 that deal with finding probabilities for normal random variables. Calculators and the binomial and normal tables in the textbook will be allowed on the exam. Also, one 8.5" by 11" sheet of handwritten notes (front and back) will be allowed.

I have not timed these questions. They are simply a collection of questions from several old exams.

1) The number of emergency calls, X, that Dr. Suess receives during a typical day has the following probability distribution:

Number of calls, x	Probability $p(x)$
0	?
1	0.28
2	0.20
3	0.10
4	0.02

   a) What is the probability Dr. Suess receives no emergency calls in a day?
   b) Calculate the mean and standard deviation of X.
   c) Explain the meaning of the mean calculated in part (c) without using statistical jargon.

2) A machine manufactures a large number of bolts of a certain type. It is known that 15% of all bolts are defective. If 10 bolts are randomly selected, find the probability

   a) Exactly 3 are defective
   b) At least 2 are defective
   c) What are the mean and standard deviation of the number of defective bolts among a sample of 10?
   d) If 200 bolts are randomly selected, would it be unusual to observe 50 defective bolts?

3) A busy person is going to buy two *different* snacks from a vending machine by randomly selecting them. There are four choices: bananas (B), apples (A), Snickers candy bars (S), and cookies (C).

   a) List the sample space, S, for this experiment using the given abbreviations.
   b) Let the random variable X represent the number of fruits the person gets in the two randomly selected snacks. Give the probability distribution of X.
   c) Given that one of the person's randomly selected snacks is a fruit, what is the probability that both are fruits.

4) Which of the following does not satisfy the binomial setting?
   a) A bowl contains 10 balls. 2 are red and 8 are white. Three balls are randomly selected *without* replacement. Count the number of red balls in the three picked.
   b) Count the number of people in line at Taco Bell at noon today.
   c) Randomly select 50 physicians who reside in the US and determine the number who worked over 45 hours last week.
   d) Randomly select 50 physicians who reside in the US and record the number of hours worked last week by each one.
   e) Toss a pair of fair dice 10 times and determine the number of times doubles occurs.
   f) Toss a pair of fair dice until doubles appears.

5) An automobile dealer sells both foreign and domestic cars. 60% of the cars are foreign, and 40% are domestic. Of the foreign cars, 10% are yellow while 20% of the domestic cars are yellow.

   a) What is the total percent of yellow cars on the lot?
   b) Given the car is yellow, what is the probability it is domestic?

6) You play a game where you toss a fair die. If an even number shows up, you win that many dollars. If an odd number shows up, you lose 6 dollars.
   a) What is the probability distribution of the amount won or lost on this game?

x				
p(x)				

   b) What is the expected value of the amount won or lost?
   c) Interpret the expected value from part (b) without using any statistical jargon.

7) Suppose weights of newborn babies are normally distributed with a mean of 7.2 lbs and a standard deviation of 1.1 lbs. If a newborn baby is randomly selected, what is the probability it weighs

   a) Between 6.0 an 8.0 lbs
   b) What percent of newborns weigh over 9.5 lbs?
   c) Give an interval centered at the mean which will contain 99.7% of all newborn babies' weights.