Name:

MATH 320: In-Class 10-2

1. Consider the experiment of drawing from a deck of cards with replacement.
   (a) What is the probability that the third heart appears on the tenth draw?

   (b) What is the probability that the third heart appears before the seventh draw?

   (c) What is the mean number of cards drawn to get the fifth red card?

2. (a) In a hospital there are 120 patients, 10 of whom have a particular disease. If a doctor is assigned 6 patients, what is the probability they receive more than 2 of these patients?

   (b) In a different hospital there are 30 patients, 13 of whom have a particular disease. If another doctor is assigned 22 patients, what is the probability they receive no more than 8 of these patients?

3. An insurance company has 5,000 policyholders who have had policies for at least 10 years. Over this period there have been a total of 12,200 claims on these policies. Assuming a Poisson distribution for these claims, answer each of the following questions:

   (a) What is λ, the average number of claims per policy per year?

   (b) What is the probability that a policyholder will file less than 2 claims in a year?

   (c) If all claims are for \$1,000, what is the mean and variance for the claim amount for a policyholder in a year?

4. A company prices its hurricane insurance using the following assumptions:

   (i) In any calendar year, there can be at most one hurricane.

   (ii) In any calendar year, the probability of a hurricane in 0.05.

   (iii) The number of hurricanes in any calendar year is independent of the number of hurricanes in any other calendar year.

   Using the company's assumptions, calculate the probability that there are fewer than 3 hurricanes in a 20-year period.