Part 7.7: Mixed Questions

1. The probability of a teacher being involved in extracurricular activities is 65%. If there are 130 teachers at a school:
    a. Choose a distribution to model this situation and justify your choice.
    b. What is the probability that at least half of the teachers are involved in extracurricular activities?
    c. What is the expected number of teachers involved in extracurricular activities?
    d. The school knows that the likely hood of having the number of teachers they actually do have involved in extracurricular activities is 1.126%. How many teachers do they have involved?
2. An experiment is being conducted to see if a coin is fair. It is thrown a certain number of times and the results are recorded if it is a heads or a tails.
    a. Choose a distribution to model this situation and justify your choice.
    b. If the coin is a fair coin and is thrown 100 times, what is the probability that less than 40 of them it comes up heads?
    c. If the coin was thrown 100 times, what would the mean and the standard deviation be for the expected number of heads if the coin is fair?
    d. The researchers did this experiment 1000 times, flipping the coin 100 times and recording the results. On 80 of the experiments 55 heads came up. Based on this what is the probability that the coin shows heads on each flip, and therefore is it a fair coin?
3. The probability that a morning is foggy is 5%.
    a. Choose a distribution to model the number of foggy mornings in a week and justify your choice.
    b. What is the probability that there are no foggy mornings in a week (7 days)?
    c. Calculate the probability that there are more than 2 foggy mornings in a week (7 days).
    d. If the probability of getting 2 foggy days over a period of time is 0.198. How many days is this period of time?
    e. What is the probability that on two consecutive weeks that there are more than two days each week that are foggy? Comment on the validity of any assumptions you have made.