ISyE 6739 – Group Activity 3

Names:

Problem 1:

A random sample of 50 units is drawn from a production process every half hour. The fraction of nonconforming product manufactured is 0.02. What is the probability that $\hat{p} \le 0.04$ if the fraction nonconforming really is 0.02?

Problem 2:

Patients arriving at an outpatient clinic are routinely screened for high blood pressure. Assume that this condition occurs in 15% of the population.

(a) What is the probability that the third patient of the day has high blood pressure?

(b) What is the average number of patients that must be seen to find the first patient with high blood pressure?

(c) If the clinic typically sees 50 patients each day, what is the probability of finding 10 patients with high blood pressure?

Problem 3: Solve this problem when sampling is with/without replacement.

A lot of size $N = 30$ contains three nonconforming units. What is the probability that a sample of five units selected at random contains exactly one nonconforming unit? What is the probability that it contains one or more nonconformances?

Problem 4:

The billing department of a major credit card company attempts to control errors (clerical, data transmission, etc.) on customers' bills. Suppose that errors occur according to a Poisson distribution with parameter $\lambda = 0.01$. What is the probability that a customer's bill selected at random will contain one error?

What is the probability the at least one error is found in 2 customer's bills?

Problem 5: In a steel sheet manufacturing process, both the length and width of produced sheets are normal random variables with mean 10 and 15, respectively, and standard deviation 1. The correlation between length and width is 0. The standard states that the perimeter of the produced still sheet must be between 47 and 52. If the produced sheets are exactly rectangular, what is the percentage of waste product? What is the probability of producing at least one defective out 5 sheets?