IE-231 In-Class Activity - Week 10

Due Date Apr 18, 2017, 14:00

This is a graded in-class assignment. Show all your work in R Markdown files. Submit compiled Word files only.

1. Patients arrive at the doctor's office according to Poisson distribution with $\lambda = 2$/hour.

   a) What is the probability of getting less than or equal to 2 patients within 2 hours?
   b) Suppose each arriving patient has 50% chance to bring a person to accompany. There are 10 seats in the waiting room. At least many hours should pass that there is at least 50% probability that the waiting room is filled with patients and their relatives?

2. Two friends (A and B) agree to meet on 4:00 PM. A usually arrives between 5 minutes early and 5 minutes late. B usually arrives between 5 minutes early and 15 minutes late. Their times of arrival are independent from each other.

   a) What is the probability that B arrives definitely later than A?
   b) What is the expected time that A waits B?
   c) What is the probability that both meet early?

3. There are three computers, which provides answers to questions with speed according to exponential distribution with means $(1/\lambda)$ 6, 4 and 3 per hour, respectively. What is the probability that at least one machine provides an answer within the first hour?

4. A pack of flour contains 1 kg of flour. Though a flour pouring machine has a standard deviation of 50 gr.

   a) What is the probability that a randomly selected package contains between 925-1075 grams of flour?
   b) If a proper flour package should contain between 1000-x and 1000+x grams of flour, what should x be that 80% of the packages are deemed proper?
   c) Your customer strictly declared that 95% of the packages should contain at least 1000 grams of flour, so you should adjust the mean value. What should be the new mean value?

5. Suppose the the pdf of a random variable x is $f(x) = \dfrac{a}{(1-x)^0.5}$ for $0 < x < 1$ and 0 for other values of x.

a) Find the constant a and sketch pdf with R.
b) Find cdf value off $F(X < 1/4)$.