

# IE-231 In-Class Activity - Week 10

*Nov 28, 2017*

1. Suppose people arrive at a bank with poisson rate  $\lambda = 4$  per hour.
  - a) What is the probability that 5 people arrive in the first half hour?
  - b) What is the probability that at least 3 people arrive in the first hour?
2. Patients arrive at the doctor's office according to Poisson distribution with  $\lambda = 4$ /hour.
  - a) What is the probability of getting less than or equal to 8 patients within 2 hours?
  - b) Suppose each arriving patient has 25% chance to bring a person to accompany. There are 20 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?
3. Suppose the the pdf of a random variable  $x$  is  $f(x) = \frac{a}{(1-x)^{1/3}}$  for  $0 < x < 2$  and 0 for other values of  $x$ .
  - a) Find the constant  $a$ .
  - b) Find cdf of  $F(X < 3/4)$ .
4. Let  $X$  and  $Y$  be the random variables and  $f(x, y)$  is the probability density function of the joint distribution. Suppose  $f(x, y) = a(\frac{5x}{7} + \frac{9y^3}{2})$  if  $0 < x < 2$  and  $-1 < y < 1$  (0 otherwise).
  - a) Find  $a$ .
  - b) Find the marginal distribution of  $y$  ( $h(y)$ ) and  $h(y < 0.5)$ .
  - c) Find the conditional distribution of  $f(y|x)$ .