

Problem Set-3

Submission deadline is on: 14/09/2018, 11.15 AM.

Use the standard normal table provided in my webpage

1. Each child in a family is equally likely to be a boy or a girl. Find the minimum number of children the family should have so that the probability of it having at least a boy and at least a girl is at least 0.95. (Use Binomial distribution)
2. In a certain population an average of 13 new cases of esophageal cancer are diagnosed each year. If the annual incidence of esophageal cancer follows a Poisson distribution, find the probability that in a given year the number of newly diagnosed cases of esophageal cancer will be: (a) Exactly 10 (b) At least eight (c) No more than 12 (d) Between nine and 15, inclusive (e) Fewer than seven
3. If X is described by a Gaussian distribution of mean μ and variance σ^2 , calculate the probabilities that X lies within 1σ , 2σ and 3σ of the mean.
4. An investigator notices that children develop chronic bronchitis in the first year of life in about 3 out of 20 households where both parents are chronic bronchitis, as compared to the national incidence rate of chronic bronchitis, which is 5% in the first year of life. How likely are infants in at least 3 out of 20 households will develop chronic bronchitis if probability of developing the disease in any one household is .05?
5. If X and Y are two independent Binomial random variables then find out the moment generating function of the random variable $X + Y$.
6. Find out the moment generating function for a normal random variable X with mean μ and variance σ^2 .
7. The weights of a certain population of young adult females are approximately normally distributed with a mean of 132 pounds and a standard deviation of 15. Find the probability that a subject selected at random from this population will weigh: (a) More than 155 pounds (b) 100 pounds or less (c) Between 105 and 145 pounds.