

ProblemSet2 Answers

Question 1:

a. Experiment and Sample Space: An Experiment is a procedure to observe outcome under specific conditions. Sample space is a set of all the possible outcomes which are obtained from an experiment.

b. Random Variable: Random variable is a numerical value that matches the possible outcomes of an experiment.

c. Probability Distribution: Probability Distribution is a function with random variable's values as inputs and probability of that value's as output.

d. Cumulative Probability Distribution: The Cumulative Probability Distribution is a function that takes random variable values and numbers less than this value as input and the sum of these probabilities as output.

e. Expected Value and Variance: Expected value is a value that is average value for a random variable and it is obtained with repeated trials. Variance is a value that gives how much a random variable's value deviate from the average.

f. Joint Probability Distribution: Joint Probability Distribution is a function gives the probabilities of two or more discrete random variables together.

g. Marginal and conditional probability distributions: Marginal probability distribution is a function which is obtained from a joint probability distribution by summing the probabilities of all possible outcomes for just one random variable on a specified value. Conditional probability distribution is a function for all the possible outcomes of a random variable under some conditions.

h. Covariance and Correlation: Covariance is a statistical value that measures how two random variable change together. Positive covariance means that variables change same direction and Negative covariance means that variables change opposite direction. Since the covariance is hard to understand covariance we have Correlation that measures how two random variable change together with a value between $(-1,1)$. "-1" means that they have perfect negative relation, "0" means they are independent and "1" means that they have perfect positive relationship.

i. Skewness and Kurtosis: Skewness is a statistic to find how the data deviated around the average. Kurtosis is a statistics that measure whether tails are fat or not.