

**Assignment-3**

1. Two hundred passengers have made reservations for an airplane flight. If the probability that the passenger who has a reservation will not show up is 0.01. What is the probability that exactly 3 will not show up?
2. The length of life for an automatic dishwasher is approximately normally distributed, with a mean of 3.5 years and a standard deviation of 1.0 years. If this type of dishwasher is guaranteed for 1 year, what is the probability that the dishwasher will require replacement?
3. Five individuals from an animal population thought to be near extinction in a certain region have been caught, tagged, and released to mix into the population. After they have had an opportunity to mix, a random sample of 10 of these animals is selected. Let X is the number of tagged animals in the second sample. Suppose there are actually 25 animals of this type in the region. Find the probability of
4. Exactly two of the animals in the second sample are tagged.
5. At most two of the animals in the recapture sample are tagged.
6. Determine the mean and variance of X.

1. a) Determine the probability that the Income Tax Authorities will catch 3 income tax returns with illegitimate deductions, if it randomly selects 6 returns from 20 income tax returns of which 8 contain illegitimate deductions.
2. Find the probability that the Income Tax Authorities will catch at least 3 income tax returns with illegitimate deductions.
3. Let X denote the number of traps (defects of a certain kind) in a particular type of metal oxide semiconductor transistor, and the average number of traps was found to be 2. What is the probability that there are
4. Exactly three traps
5. At most three traps

6- Mopeds (small motorcycles with an engine capacity below 50 cm3) are very popular in Europe because of their mobility, ease of operation, and low cost. A rolling bench test for determining maximum vehicle speed was described. A normal distribution with mean value 46.8 km/h and standard deviation 1.75 km/h is postulated. Consider randomly selecting a single such moped.

a) What is the probability that maximum speed is at most 50 km/h?

b) What is the probability that maximum speed is at least 48 km/h?

7- The painted light bulbs produced by a company are 50% red, 30% blue and 20% green. In a sample of 5 bulbs. Find the probability that 2 are red, 1 is green and 2 are blue.

8- It is claimed that an automobile is driven on the average more than 20,000 kilometers per year with the standard deviation of 3900 kilometers. To test this claim a random sample of 100 automobile owners are asked to keep a record of the kilometers they travel. Would you agree with the claim if the random sample showed an average of 23,500 kilometers? Use a 0.01 level of significance.

9- Can you reject a claim that the average age of members of parliament is at least 50 with the standard deviation of 3.1 years? If a random sample of 36 members has a mean age of 48.7, assume all ages are normally distributed. Take α = 0.01.

10- According to a genetics theory, a certain cross of guinea pigs will result in red, black and white offspring in the ratio 8:4:4. Find the probability that among 8 offspring, 5 will be red, 2 black and 1 is white.