



**SAIDS**

**Assignment on Module 2**

- 1) The average number of acres burned by forest and range fires in a large New Mexico county is 4300 acres per year, with a standard deviation of 750 acres. The distribution of the number of acres burned is normal. What is probability the between 2500 and 4200 acres will be burned in any given year?

Ans: 0.4401

- 2) What number of burnt acres corresponds to the 38<sup>th</sup> percentile?

Ans: 4067.5

- 3) The CEO of light bulbs manufacturing company claims that an average light bulb lasts 300 days. A researcher randomly selects 15 bulbs for testing. The sampled bulbs last an average of 290 days, with a standard deviation of 50 days. If the CEO's claim were true, what is the probability that 15 randomly selected bulbs would have an average life of no more than 290 days?

Ans: T score of the marks is 0.226

- 4) If the sample mean and expected mean value of the marks obtained by 15 students in a class test is 290 and 300 respectively. What is the t-score if the standard deviation of the marks is 50?

Ans: T score of the marks is -0.7745.

- 5) Find the area under a T curve with degrees of freedom 10 for  $P(1 \leq X \leq 2)$ . Use the t distribution on a TI 83.

Ans: T score of the height is 0.133752549, or about 13.38%.

- 6) Let  $X$  be a random variable with mean  $\mu=20$  and standard deviation  $\sigma=4$ . A sample of size 64 is randomly selected from this population. What is the approximate probability that the sample mean  $\bar{X}$  of the selected sample is less than 19?

$P(\bar{X} < 19) = P(Z < -2) \approx 0.0228$

- 7) Let  $\bar{x}$  be the mean of a random sample of size 50 drawn from population with mean 112 and standard deviation 40. Find the mean and standard deviation of  $\bar{X}$ . Find the probability that assumes value between 110 and 114. Find the probability that assumes value greater than 113

- 8) The average weight of a water bottle is 30 kg with a standard deviation of 1.5 kg. If a sample of 45 water bottles is selected at random from a consignment and their weights are measured, then what is the probability that the mean weight of the sample is less than 28 kg?
- 9) Some vehicles pass through a junction on a busy road at an average rate of 300 per hour.
- Find out the probability that none passes in a given minute.
  - What is the expected number of passing in two minutes?
  - Find the probability that this expected number found above actually pass through in a given two-minute period.
- 10) Find the standard error of the estimate for the average number of children in a household in your city by using the data collected from a sample of of households in your city. Then find a 95% confidence interval for the data.

Household	Number of Children
1	2
2	3
3	1
4	0
5	5
6	2
7	1
8	4

- 11) Let  $X$  = amount of time a shopkeeper spends with his customer follows exponential distribution with the average amount of time equal to 4 minutes. Find the probability that the shopkeeper is going to spend 5 minutes with the customer?
- 12) The amount of time a student takes to solve any problem follows an exponential distribution with the average amount of time equal to 8 minutes. What will be the probability that he will take 5 minutes to solve the problem?
- 13) The probability of a man hitting the target at a shooting range is  $1/4$ . If he shoots 10 times, what is the probability that he hits the target exactly three times? What is the probability that he hits the target at least once?

14) A pharmaceutical lab states that a drug causes negative side effects in 3 of every 100 patients. To confirm this affirmation, another laboratory chooses 5 people at random who have consumed the drug. What is the probability of the following events?

1. None of the five patients experience side effects.

2. At least two experience side effects.

3. What is the average number of patients that the laboratory should expect to experience side effects if they choose 100 patients at random.

15) You want to rent an unfurnished one-bedroom apartment in Durham, NC next year. The mean monthly rent for a random sample of 60 apartments advertised on Craig's List (a website that lists apartments for rent) is \$1000. Assume a population standard deviation of \$200. Construct a 95% confidence interval.

Ans: \$949.39, \$1050.61