AccelerateAI

Data Science Global Bootcamp

Probability & Statistics: Assignment 03

Q1: MyGrocery.com, an online grocery store, makes a claim to deliver orders within 90 minutes. Based on past data, it was found that the average time to deliver is 68 min with standard deviation of 14 minutes, and follows a normal distribution.

1) What proportion of orders is delivered after 90 minutes?

2) What should be the promised delivery time, if the target is to deliver at least 99% orders before that time?

Q2. The flight delay times of planes leaving San Diego airport in California are monitored (on time flights or early departures are not included, hence no negative times). The delay in departures of 6 flights are noted. These delay times are 5.5, 10.5, 13, 22.5, 45, 55 minutes.

A family of 5, is delayed to the airport by 25 minutes. What is the probability that they will catch their flight? (Use a t-distribution with 5df)

Q3. The number of miles traveled by a given car before its transmission ceases to function is governed by the exponential distribution with mean 100, 000 miles. What is the probability that a car's transmission will fail during its first 50,000 miles of operation?

Q4. The time to failure (in hours) of a bearing in a mechanical shaft is satisfactorily modeled as a Weibull random variable with α =5000 and gamma = 0.5.

a) Determine the probability that a bearing lasts fewer than 6000 hours
b) What is the mean time to failure?

Q5. Identify the data type of the following as ***nominal, ordinal, interval or ratio scale:***

S No	Description	Data Type
1	GMAT Score	
2	Blood Type	
3	Credit Score	
4	Temperature (Celsius)	
5	Temperature (Kelvin)	
6	Zip code	
7	Shoe Size (UK)	
8	Birth Year	
9	Military Rank	
10	Tax rate	

Q6. A population has a mean of μ=35 and a standard deviation of σ=5. After 3 is added to every score in the population, what are the new values for the mean and standard deviation?

Q7. A consulting firm is analyzing the expenses for its employees during a meetup event. A sample of 80 professionals are surveyed and the average amount spent by them on travel and beverages is $593.84. The sample standard deviation is approximately $369.34. Construct a 95% confidence interval for the population mean amount of money spent during the event.

Q8. As an asset manager in the large global Investment Banking firm, you are tasked to analyze the portfolio of your customers and help them predict risk. For the distribution of the dataset you have, the Karl Pearson's coefficient of skewness is 0.64, standard deviation is 13 and mean is 59.2. Find the mode and median of the distribution.

Q9. One of the IPL franchises is formulating strategy for the next auction during team selection. A player is to be selected for their team. The choice is between player A and player B given below, on the basis of their past 5 batting performances.

A 25 85 40 80 120

B 50 70 65 45 80

Which player should they choose if they want:

- a higher run-getter

- a more consistent and reliable batter into the team

Answer for both these options with explanation.

Q10. In a manufacturing setup, assume that two machines produce a part of the product which are on average 10 inches long. A sample of 11 parts are selected from each machine.

Machine A: 6, 8, 8, 10, 10, 10, 10, 10, 12, 12, 14.

Machine B: 6, 6, 6, 8, 8, 10, 12, 12, 14, 14, 14.

Which machine is better?

Q11. Examples related to various sampling methods are provided below. **Identify** the **odd one out**.

a) Asking volunteers at the mall
b) Pilot testing of a new product launch
c) Find brand of smartphone preferred by people based on either gender or age or socio-economic status
d) Pick all students and split them by grade and select random from each grade