

Statistics 236
Exam II

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Question # 1

In a public opinion survey conducted by Alpha International For Research and Polling in 2001, showed that the percentage of adult Palestinians who prefer to watch news cast through Al-Jazeera Channel is $P=50\%$. Suppose that we selected 10 Palestinians at random. Let X be the number who prefer to watch news cast through Al-Jazeera Channel.

- a- What is the distribution of the distribution of the random variable X .
- b- Find the probability that X equals 5.
- c- Find the probability that X is less than 2.
- d- Find the mean and variance of the random variable X .
- e- Find the probability that X is greater or equal to 6 using the normal approximation.
- f- Suppose we took a random sample of 10 Palestinian adults and we found that 1 of them only prefers to watch news cast through Al-Jazeera Channel. Does this indicate that the percentage of those who like watch the news cast through Al-Jazeera has become lower than 50%? Why?
- g- Why do you think media surveys are important for marketing? That is monitoring the percentage of Palestinians preference of watching certain news or movie channels.

Question # 2

A company produces a certain type of soft drink. The company claims that their bottles contain an average of 1 liter with a standard deviation of 0.02 liter. Assuming that the bottles sizes are normally distributed :

- a- Find the percentage of bottles with size greater than 1.02 liters.
- b- Find the percentage of bottles with size between 0.96 and 1.01 liters.
- c- Find the 90th percentiles of the sizes and interpret its value.

Question # 3

A consumer group for quality control wanted to check the claim of the company, they took a random sample of 25 bottles. Assuming the sizes of the bottles are normally distributed.

- a- What is the distribution of the sample mean.
- b- $P(0.99 < \text{sample mean} < 1.01)$. Interpret the result.
- c- $P(0.98 < \text{sample mean} < 1.02)$. Interpret the result.

Question # 4

Refer to question # 3. Suppose that the sample of 25 bottles that was taken at random produced a sample mean of 0.97 liters.

- a- Construct a 95% confidence interval for the population mean.
- b- Does the confidence interval support or negate the claim of the company of producing an average size of 1 liter.

Question # 5

A survey was conducted among BZU students to estimate the mean daily expenditure of female and male students at the university. A sample of $n=25$ females was interviewed produced a sample mean daily expenditure of 35 NIS with a sample standard deviation $S=10$ NIS. While a sample of $n=25$ male students produced a sample mean of 25 NIS with a sample standard deviation $S=10$ NIS.

- a- Construct a 95% confidence interval for the mean daily expenditure of the female population at BZU.
- b- Construct a 95% confidence interval for the mean daily expenditure of the male population at BZU.
- c- Do the results in a, b indicate that the population mean daily expenditure among females is more than that among males? Explain your answer.

Question # 6

- a-Why is it important to know the distribution of a certain random variable.?
- b-Why is the sample mean considered to be a random variable ? Explain. Give an example.