**Questions:**

1. **What are the measures of central tendency, and how do they differ from each other?**

**Ans:** Central tendency refers to typical or central values around which data points cluster. It gives an idea of the average or typical value in the dataset. The most common measures of central tendency are:
**Mean:** Athematic average of all the values in the dataset is calculated by adding up all the values and then dividing by the number of values.
**Mode:** Data that repeats most of the time is considered as mode.
**Median:** Middle value in a dataset when it is arranged in ascending or descending order. suppose the number of data present in the dataset is odd then a middle number of the dataset after arranging in ascending or descending order in the median. If the number of data present in the dataset is even then the average of the two middle numbers is the median after arranging them in ascending or descending order.

2. **How do you interpret the standard deviation in the context of data variability?**

**Ans:** Standard deviation square root of variance. More the data spread out in the set it has less consistency. If data is close to the mean, it has more consistency.

3. **What is a box plot, and what information can you extract from it?**

**Ans:** Box plot is a graphical representation of the distribution of data. Box spans from Q1 to Q3 with a line marking as median, whiskers extend from minimum to maximum excluding outlier. It can provide information about Median, Quartiles, IQR, Whiskers, Outliers.

4. **Explain the significance of the interquartile range (IQR) and how it is used to detect outliers.**

**Ans:** IQR measures how data is spread out in the middle part of a set of numbers. A large IQR indicates greater variability among the central 50% of the data, while a small IQR suggests less variability. IQR ranges between 50% to 75% of the quartile in the dataset. IQR does not affect outliers it provides a more reliable and robust measure of spread.

5. **How Do Maximum Likelihood Estimators (MLE) Work?**

**Ans:** Maximum Likelihood Estimators (MLE) work by finding the values of model parameters that maximize the likelihood of observing the given data. It assumes a specific probability distribution (like normal distribution for heights) and calculates the likelihood function to determine which parameter values make the observed data most probable. MLE seeks the peak of this likelihood function, providing estimates that best fit the data according to the chosen model, enabling statistical inference and prediction.