

Q1. What is Statistics?

Statistics is the branch of mathematics that deals with the **collection, organization, analysis, interpretation, and presentation of data** to make decisions and draw conclusions.

Q2. Define the different types of statistics and give an example of when each type might be used.

There are two main types of statistics:

1. Descriptive Statistics

- Summarizes and describes data
- Uses charts, tables, averages, and measures of spread

Example:

Calculating the **average marks** of students in a class.

2. Inferential Statistics

- Uses sample data to make predictions or conclusions about a population
- Includes hypothesis testing and confidence intervals

Example:

Using survey data from 100 voters to **predict election results** for a country.

Q3. What are the different types of data and how do they differ from each other?

Data is mainly classified into **Qualitative** and **Quantitative** data.

1. Qualitative (Categorical) Data

- Describes qualities or characteristics
- Cannot be measured numerically

Example: Gender, color, blood group

2. Quantitative (Numerical) Data

- Represents numerical values
- Can be measured and counted

Example: Height, weight, number of students

Q4. Categorise the following datasets with respect to quantitative and qualitative data types:

Dataset	Data Type
(i) Grading in exam (A+, A, B...)	Qualitative (Ordinal)
(ii) Colour of mangoes	Qualitative (Nominal)
(iii) Height data of a class	Quantitative (Continuous)
(iv) Number of mangoes exported	Quantitative (Discrete)

Q5. Explain the concept of levels of measurement and give an example of a variable for each level.

Levels of measurement describe how data is measured and classified.

1. Nominal

- Categories with no order
Example: Blood group (A, B, AB, O)
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2. Ordinal

- Categories with a meaningful order
Example: Exam grades (A, B, C)
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3. Interval

- Numeric data with equal intervals, no true zero
Example: Temperature in Celsius
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4. Ratio

- Numeric data with equal intervals and a true zero
Example: Weight, height, age
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Q6. Why is it important to understand the level of measurement when analyzing data?

Understanding the level of measurement is important because it determines:

- Which **statistical methods** can be used
- Which **graphs** are appropriate
- What **conclusions** are valid

Example

- You can calculate the **mean** for height (ratio data)
- You **cannot** calculate the mean for blood group (nominal data)

Using the wrong method can lead to **incorrect results**.

Q7. How is nominal data different from ordinal data?

Feature	Nominal Data	Ordinal Data
Order	No order	Ordered
Comparison	Only equality	Rank comparison
Example	Gender, color	Grades, satisfaction levels

Q8. Which type of plot can be used to display data in terms of range?

A **Box Plot (Box-and-Whisker Plot)** is used to display data in terms of:

- Minimum
 - Maximum
 - Median
 - Range
 - Quartiles
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Q9. Describe the difference between descriptive and inferential statistics.

Descriptive Statistics

- Summarizes data
- Uses mean, median, charts

Example:

Average income of 50 employees in a company.

Inferential Statistics

- Draws conclusions about a population
- Uses probability and sampling

Example:

Predicting national income trends based on a sample survey.

Q10. What are some common measures of central tendency and variability?

Measures of Central Tendency

Measure	Description	Use
Mean	Average	General performance
Median	Middle value	Skewed data
Mode	Most frequent value	Categorical data

Measures of Variability

Measure	Description	Use
Range	Max – Min	Overall spread

Variance	Average squared deviation	Data dispersion
Standard Deviation	Spread around mean	Consistency of data

Conclusion

- **Central tendency** shows where data is centered
- **Variability** shows how spread out the data is