Day 1 Statistics Assignment: Introduction to Statistics

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Part A: Conceptual Understanding

1. What is Statistics?

In your own words, define statistics and explain why it is important in everyday life. Provide one real-world example of how statistics might be used.

Answer:

Statistics: is the branch of mathematics which deals with collection, organizing, analyzing, and interpreting of data.

Statistics is important in every day life because:

- We need to make inform decision rather than guessing
- It helps us understand trends (sales over time)
- It helps us to make conclusions

Real World Example:

Companies use statitics to track:

- Market trends
- Revenue over time
- Which employee are most likely to leave

2. Population vs. Sample

a) Define population and sample in statistical terms. (1 line answer)

Population: Population is the whole group of individuals, items, or data under study of interest.

Sample: Sample is the subset or part of the population selected for analysis.

b) Explain why we often use samples instead of studying entire populations.

Answer:

Sample is used instead of population because collecting data from population is:

- Impractical
- Time consuming
- Expensive

While a well-chosen sample can provide reliable insights quickly and efficiently.

3. Types of Statistics

Match each example with the correct type of statistics (Descriptive or Inferential):

Example	Type
The average height of students in your class is 5'6"	Descriptive
Based on a survey of 1,000 voters, we predict the election outcome	Inferential
75% of customers rated our service as "excellent"	Descriptive
A study concludes that a new drug is effective for the general population	Inferential

4. Types of Data / Attribute

Classify each variable as Qualitative or Quantitative:

Variable	Type
Eye color	Qualitative
Number of siblings	Quantitative
Brand of smartphone	Qualitative
Temperature in Celsius	Quantitative
Student ID number	Qualitative
Height in inches	Quantitative

Note: Student ID number is technically a number, but it is used for identification, not for calculation or measurement. So it is treated as qualitative (nominal).

5. Data Classification Challenge

For each research question, identify:

- Whether you would use descriptive or inferential statistics
- What type of data (qualitative/quantitative) you're dealing with
- Whether you're working with a population or sample

a) Research Question: "What is the most popular pizza topping among customers at Mario's Pizza last month?"

- Type of statistics: Descriptive
- Type of data: Qualitative
- Population or Sample: Population **if all costumers are considered**

b) Research Question: "Do students who study more than 3 hours daily perform better on standardized tests nationwide?"

- Type of statistics: Inferential
- Type of data: Quantitative
- Population or Sample: Sample

c) Research Question: "What was the average temperature in Karachi during July 2024?"

- Type of statistics: Descriptive
- Type of data: Quantitative
- Population or Sample: Population if using complete weather data from the month