1. Data Visualization Concepts

1(a) Data Visualization is the process of representing data _____ using charts, graphs, and visuals to make _____ easier to understand.
Answer: graphically; patterns, trends, and insights

1(b) Two reasons why data visualization is important for decision-making are:

- It helps decision-makers identify _____ and _____ quickly.
- It simplifies _____, making information easier to interpret and communicate.
  Answer: trends; insights; complex datasets

1(c) Two differences between Business Intelligence (BI) and Data Analytics are:

- BI focuses on _____ and _____ analysis, while Data Analytics focuses on _____ and _____ analysis.
- BI answers "_____ happened?" while Data Analytics answers "_____ happen?"
  Answer: descriptive; diagnostic; predictive; prescriptive; What; What will

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2. Data Types

2(a) Categorical data represents _____ or labels, e.g., _____.
Numerical data represents _____ that can be measured, e.g., _____.
Answer: categories; department name, gender; measurable quantities; patient count, temperature

2(b) Discrete data represents _____ values that cannot include decimals, e.g., _____.
Continuous data represents values measured on a _____ scale and can include decimals, e.g., _____.
Answer: whole number; number of patients; continuous; body temperature, weight

2(c) Two reasons why understanding the audience is important when designing visualizations:

- Ensures the audience can interpret the data _____.
- Avoids confusing or overly _____ visuals.
  Answer: quickly and correctly; technical/confusing

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3. Patterns in Data

3(a) Identify the pattern (trend, cluster, or outlier) for each scenario:

- i) One product's sales were much higher than all others: _____

- ii) Monthly website traffic shows a steady increase over a year: _____
- iii) Several customers purchase similar amounts regularly: _____
  Answer: Outlier; Trend; Cluster

3(b) One reason why recognizing each pattern is important:

- For i) _____
- For ii) _____
- For iii) _____
  Answer: May indicate special attention or error; Helps in planning resources or predicting future trends; Identifies common behaviors or groupings

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4. Choosing the Right Visualization

For each dataset, write the most suitable chart type:

- a) Daily website visits over a month: _____
- b) Age distribution of customers: _____
- c) Sales volume across regions and weeks: _____
- d) Number of products sold in each category: _____
- e) Percentage of male versus female customers: _____
  Answer: Line chart; Histogram / Box plot; Heatmap; Bar chart; Pie chart

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5. Contextual Bias and Dashboard Design

Identify two sources of bias, why each is harmful, and how to reduce it:

- Bias 1: _____
- Harm: _____
- Mitigation: _____
  Answer: Data only from one department / region; Gives an incomplete or misleading picture; Include data from all relevant areas
- Bias 2: _____
- Harm: _____
- Mitigation: _____
  Answer: Missing or incomplete records; May hide real trends or issues; Clean data, handle missing values, label incomplete data