

Chapter 1 Statistics Is About Using Data in Decision Making

Remember to look at the key points of a learning unit before studying them in detail. Here you will see that this unit covers definitions related to the nature of statistics, the nature of measurement, and the collection of data.



I. The nature of statistics

A. Many disciplines use statistics.

1. Business and Economics
2. Natural and Social Sciences
3. Physical Sciences
4. Education
5. Politics

B. Basic definitions

1. **Population:** totality under study such as the students attending a school
2. **Sample:** subset of a population such as the students in one class of a school
3. **Parameter:** a characteristic of a population such as the average age of students attending a school
4. **Statistic:** a characteristic of a sample such as the average age of students in a class of a school

C. **Statistics** is the science of collecting, organizing, presenting, analyzing, and interpreting numerical data in relation to the decision making process.

1. **Descriptive statistics** summarizes numerical data using numbers and graphs. The grades of students in a class can be summarized with averages and line graphs.
2. **Inferential statistics** uses sample statistics to estimate population parameters. The average age of students in a class can be used to estimate the average age of students attending a school.

II. The nature of measurement

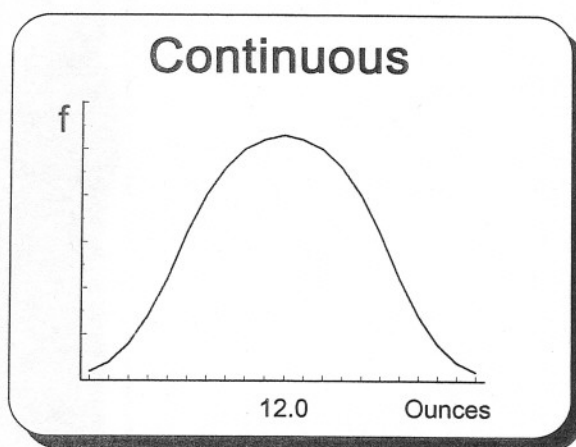
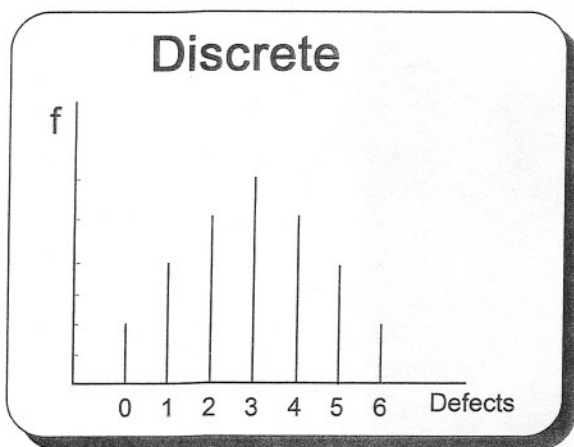
A. **Variable:** an activity subject to variation, e.g., grades on a statistics test and how someone feels

B. Quantitative versus qualitative variables

1. **Quantitative variable:** expressed numerically, e.g., a grade of 85 and a body temperature of 101 degrees
2. **Qualitative variable:** not expressed numerically, e.g., a grade of B and someone feeling poorly

C. Discrete versus continuous variables

1. **Discrete:** only finite values, such as the countable numbers, can exist on the x-axis, e.g., defects in a tire and the number correct on a true or false statistics exam
2. **Continuous:** measurement may assume any value associated with an uninterrupted scale, e.g., a bottle may contain 12.02 ounces of liquid refreshment and a person may weigh 175.25 pounds



D. The x-axis, as shown here, represents 1 of 4 measurement scales important to our study of statistics.

E. The y-axis often measures how often an x-axis measurement has occurred. This is called frequency (f).