

1.1 Definitions of Statistics, Probability, and Key Terms

Learning Objective:

In this section, you will:

- Develop your understanding of what is statistics.
- Develop your understanding of what is probability.
- Recognize and differentiate between key terms.

What is Statistics?

The science of **statistics** deals with the collection, analysis, interpretation, and presentation of data.

- **Descriptive statistics** is organizing and summarizing data. Two ways to summarize data are by graphing and by using numbers (for example, finding an average).

- **Inferential statistics** is using formal methods for drawing conclusions from "good" data.

What is Probability?

Probability is a number between 0 and 1, inclusive. It gives the likelihood that a specific event will occur.

Key Terms

- A **population** is all individuals, objects, or measurements whose properties are being studied.
- A **sample** is a subset or portion of the population being studied.
- A **parameter** is a number (average, mean, proportion) that is used to represent a characteristic of a population.
- A **statistic** is a number (average, mean, proportion) that represents a characteristic of the sample. The statistic is an estimate of a population parameter.
- A **representative sample** is a subset of the population that has the characteristics as the population.
- A **variable**, notated by capital letters such as X and Y, is a characteristic or measurement of interest for each person or object in a population.
 - o **Numerical variables** take on values that are indicated by numbers.
 - o **Categorical variables** take on values that are names or labels.
- **Data** are the actual values of the variable. They may be numbers or they may be words. **Datum** is a single value.

Example 1:

A study was conducted at a local college to analyze the average cumulative GPA's of students who graduated last year. Determine the correct key phrase (population, statistic, parameter, sample, variable and data) for each of the following phrases:

- a) all students who attended the college last year
- b) the cumulative GPA of one student who graduated from the college last year
- c) 3.65, 2.80, 1.50, 3.90
- d) a group of students who graduated from the college last year, randomly selected
- e) the average cumulative GPA of students who graduated from the college last year
- f) all students who graduated from the college last year
- g) the average cumulative GPA of students in the study who graduated from the college last year

Example 2:

Determine what the key terms refer to in the following study.

We want to know the average (mean) amount of money first year college students spend at ABC College on school supplies that do not include books. We randomly surveyed 100 first year students at the college. Three of those students spent \$150, \$200, and \$225, respectively.

1. Population –
2. Sample –
3. Parameter –
4. Statistic –
5. Variable –
6. Data –

For more information and examples see online textbook OpenStax Introductory Statistics pages 5-9.

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