Definition(s)

Statistics	Statistics is the science of collecting, organizing, summarizing, and analyzing information to draw conclusions or answer questions. In addition, statistics is about providing a measure of confidence in any conclusions.
Data	(1) A fact or proposition used to draw a conclusion or make a decision. Data can be numerical, or non-numerical. *A key aspect of data is that they vary*. (2) The list of observed values for a variable.
Population	The entire group of interest to be studied.
Individual	A person or object that is a member of the population of interest being studied.
A statistic	A numerical summary of a sample.
Descriptive Statistics	Consist of organizing and summarizing data. Descriptive statistics describe data through numerical summaries, tables, and graphs.
Inferential Statistics	Uses methods that take a result from a sample, extend it to the population, and measure the reliability of the result.

Definition(s) (cont)

Parameter	A numerical summary of a population.
Variables	The characteristics of the individuals within the population.
Qualitative (categorical) Variables	Allow for classification of individuals based on some attribute or characteristic.
Quantitative (numerical) Variables	Provide numerical measures of individuals. The values of a quantitative variable can be added or subtracted and provide meaningful results.
Approach	A way to look at and organize a problem so that it may be solved. Remember that many problems have more than one approach leading to a correct solution.
Discrete (countable) Variable	A discrete variable is a quantitative variable that has either a finite number of possible values or a countable number of possible values. The term countable means that the values result from counting, such as 0, 1, 2, 3, and so on. A discrete variable cannot take on every possible value between any two possible values.

Definition(s) (cont)

Continuous (measurable) Variable	A continuous variable is a quantitative variable that has an infinite number of possible values that are not countable. A continuous variable may take on every possible value between any two values.
Qualitative Data	Observations corresponding to a qualitative variable.
Quantitative Data	Observations corresponding to a quantitative variable. These can be broken down into two categories: 1) **Discrete Data** - observations corresponding to a discrete (countable) variable. 2) **Continuous Data** - Observations corresponding to a continuous (measurable) variable.
Nominal Level of Measurement	A variable is at the nominal level of measurement if the values of the variable name, label, or categorize. In addition, the naming scheme does not allow for the values of the variable to be arranged in a ranked or specific order

Definition(s) (cont)	
Ordinal Level of Measurement	A variable is at the ordinal level of measurement if it has the properties of the nominal level of measurement, however, the naming scheme allows for the values of the variable to be arranged in a ranked or specific order.
Interval Level of Measurement	A variable is at the interval level of measurement if it has the properties of the ordinal level of measurement and the differences in the values of the variable have meaning. A value of zero does not mean the absence of the quantity. Arithmetic operations such as addition and subtraction can be performed on values of the variable.
Ratio Level of Measurement	A variable is at the ratio level of measurement if it has the properties of the interval level of measurement and the ratios of the values of the variable have meaning. A value of zero means the absence of the quantity. Arithmetic operations such as multiplication and division can be performed on the values of the variable.

The Process of Statistics

1. Identify the research objective. A researcher must determine the question(s) he or she wants answered. The question(s) must clearly identify the population that is to be studied. 2. Collect the data needed to answer the question(s) posed in (1). Conducting research on an entire population is often difficult and expensive, so we typically look at a sample. This step is vital to the statistical process, because if the data are not collected correctly, the conclusions drawn are meaningless. Do not overlook the importance of appropriate data collection. We discuss this step in detail in Sections 1.2 through 1.6. 3. Describe the data. Descriptive statistics allow the researcher to obtain an overview of the data and can help determine the type of statistical methods the researcher should use. We discuss this step in detail in Chapters 2 through 4. 4. Perform inference. Apply the appropriate techniques to extend the results obtained from the sample to the population and report a level of reliability of the results. We discuss techniques for measuring reliability in Chapters 5 through 8 and inferential techniques in Chapters 9 through 15.