

What do I know already? (Do not look up the answers to these questions. The purpose is to assess your current level of knowledge on these topics.)

A. Researchers could theoretically collect every data point of interest to answer some research question of interest, but they typically only use a sample of data. List all of the reasons why a researcher might rely on a sample of data as opposed to the full population of data: It might be too expensive or difficult to conduct a census. It might be impossible to collect all of the measurements. Taking the needed measurements might destroy or harm the items being measured.

B. What is the major difference between a population parameter and a sample statistic? Parameters are derived from the full set of population data. A statistic is derived from only a sample of data.

C. What is the major difference between qualitative and quantitative data? Quantitative data is numeric in nature. Qualitative data is not numeric.

D. Give an example of discrete data and an example of continuous data? Discrete data: the number of courses taken during the fall semester for a set of students. Continuous Data: the length of time it takes a group of runners to complete a marathon.

Learning Objectives: (Click the learning objectives below for a short clip on the topic.)

- Define the terms population and sample (1)
- Paraphrase the Reasons for Taking a Sample (2)
- Define Population Parameters (1)
- Define Sample Statistics (1)
- Classify Values as Parameters or Statistics (2)
- Classify Data as Qualitative Data or Quantitative Data (2)
- Describe Discrete Data (1)
- Describe Continuous Data (1)
- Contrast Discrete Data and Continuous Data (2)

Exercises:

1. Airlines count and record the number of passengers on each flight they operate. This set of values is an example of: (select all that apply)

B. discrete data

E. quantitative data

2. True or False: Continuous data consists of numerical measurements that fall along a continuous scale without gaps or spaces between any two achievable values? True

3. Does the following data set contain continuous data, discrete data, or qualitative data?

Engineers count and record the number of cars that run a red light at the intersection of 8th and 107th streets in Miami over the course of three days of observations.

4. Derived from the **full set** of measurements in a population, a parameter is a numerical measure which summarizes some attribute of that population.

5. Airlines weigh and record the weight of each piece of checked luggage that flies on their aircraft. This set of values is an example of: (select all that apply)

A. continuous data

B. discrete data

C. qualitative data

D. ratio level data

E. quantitative data

6. A sample of 35 women had an average height of 64.1 inches. The average (64.1 inches) is an example of a statistic or a parameter? Why? because it comes from sample data.

7. An online retailer reviewed all of its sales and found that the average checkout total was \$54.13. The average (\$54.13) is an example of a statistic or a parameter? Why? because it came from all of the data.
8. Is the following an example of a statistic or parameter? On the day of the final last year, I asked every third person who entered the classroom how many hours he/she studied for the exam. The median response was 8.5 hours.
9. Is the following an example of a statistic or a parameter? Only 4% of students who applied to Harvard were admitted.
10. The university collects and stores students' overall ratings of professors. The ratings fall on a scale that range from excellent to poor. This set of ratings is an example of: (select all that apply)
 - A. continuous data
 - B. discrete data
 - C. qualitative data
 - D. ratio level data
 - E. quantitative data
11. In which following examples would it be best to use a sample of data instead of the full set of population data? (note: select all that apply)
 - A. To ensure that cell phones are being manufactured reliably, a quality control manager will conduct a 30 minute test on the phones that will simulate four years of wear and tear on the device. Any phone that is tested will no longer be able to be sold.
 - B. A drug manufacturer wants to know if a new pain medication is safe. It plans to give the drug to human subjects for six weeks to determine if it is indeed safe.
 - C. A gambling house in the UK would like to use a computer model to predict the outcome of upcoming NBA games. The computer model uses data from previous games to predict the outcome of a particular matchup; however, each past game has so much data, the computer takes about 12 hours to fully analyze each inputted game. The population of useable games for this analysis is typically over 500 games.
 - D. A sports journalist wants to compare the salaries (in real dollars) for NFL quarterbacks today with those from 2014.
12. Does the following data set contain continuous data, discrete data, or qualitative data? Researchers measure and record the waist circumference in inches of 125 men.

13. The university tabulates and stores students' cumulative GPAs. This set of GPAs is an example of: (select all that apply)
- A. continuous data
 - B. discrete data
 - C. qualitative data
 - D. ordinal level data
 - E. quantitative data
14. I am interested in the rate of car ownership among my students this semester. I surveyed **all** of my students and discovered that 97% of them own a car. The percentage (97%) is an example of a statistic or a **parameter**? Why?
15. Costco records the number of items purchased on each customer receipt. This set of values is an example of: (select all that apply)
- A. continuous data
 - B. discrete data
 - C. qualitative data
 - D. nominal level data
 - E. quantitative data
16. Derived from a **subset** of measurements in a population, a **statistic** is a numerical measure which summarizes some attribute of the selected set of data.