

POPULATION

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Sometimes the intended population is called the **target population**, since in badly designed studies, the collected data may not be representative of the intended population.

EXAMPLE

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While the intended population may have been all students, the real population of the survey is students who go to the cafeteria.

EXAMPLE

A local fitness center posts a survey on their website asking visitors how often they exercise each week.

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What is the population?

While the intended population may have been all members of the fitness center, the real population of the survey are people who on the website of the fitness center.

PARAMETER

A **parameter** is a value (average, percentage, etc.) calculated using all the data from a population

EXAMPLES

If you calculate the average income of every person in a city, that average is a parameter.

If you determine the percentage of all voters in a country who prefer a particular candidate, that percentage is a parameter.

CENSUS

A survey of an entire population is called a **census**.

EXAMPLE

National Census

Every ten years, the United States conducts a national census, where the government attempts to count every person living in the country. The data collected includes information such as age, gender, race, household size, and housing conditions. This information is used for things like determining the number of seats each state has in the U.S. House of Representatives.

EXAMPLE

School Enrollment Census

A school district may conduct a census at the beginning of each academic year to account for every student enrolled in its schools. The census gathers data on student demographics, such as grade level, age, and special education needs, to help allocate resources and plan educational programs.

Since surveying an entire population is often impractical, we usually select a sample to study.

SAMPLE

A **sample** is a smaller subset of the entire population, ideally one that is fairly representative of the whole population.

EXAMPLE

If you're interested in the average height of adults in a city, you might measure the height of 1,000 adults randomly selected from the city's population. This group of 1,000 people is your sample, and the average height calculated from this group is meant to represent the average height of all adults in the city.

EXAMPLE

In a political poll, a sample of voters (say, 1,500 people) is surveyed to estimate how the entire population of voters will vote in an upcoming election.

STATISTIC

A **statistic** is a value (average, percentage, etc.) calculated using the data from a sample.

EXAMPLE

If you conduct a survey with 500 people in a city and determine that 60% of them prefer a certain brand of coffee, that 60% is a statistic.

EXAMPLE

Medical Study

Researchers conduct a study with a sample of 500 patients to determine the average reduction in blood pressure after taking a new medication. They find that the average reduction in blood pressure among the sample is 10 mmHg. This 10 mmHg is a **statistic** because it is derived from the sample of patients.

EXAMPLE

Public Health Survey

A health department surveys 800 residents to estimate the prevalence of smoking in a community. They find that 10% of the respondents smoke regularly. This 10% smoking rate is a statistic because it is based on the data from the sample of residents.

QUESTION

A public health researcher wants to assess how residents of New Jersey feel about a new community initiative. To collect opinions, she goes to the New Jersey Farmers Market and randomly surveys 300 visitors. She finds that 70% of those surveyed support the initiative.

What is the sample and population?

Is the 70% value a parameter or a statistic?

QUESTION

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What is the sample and population?

Is the 70% value a parameter or a statistic?

The sample is the 300 visitors at the New Jersey

QUESTION

An economist wants to find out how employees in San Francisco feel about a proposed change in city minimum wage laws. She visits the San Francisco Ferry Building and randomly interviews 350 workers there. The results show that 55% of those interviewed support the wage increase.

What is the sample and population?

Is the 55% value a parameter or a statistic?

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Is the 55% value a parameter or a statistic?

The sample is the 350 workers interviewed at the San Francisco Ferry Building.

The population is all employees in San Francisco.

The 55% value is a statistic because it is calculated from the sample of workers, not from the entire population of San Francisco employees.

QUESTION

To estimate the average weight of apples in an orchard, a researcher picks 50 apples from different trees throughout the orchard and weighs them.

What is the sample and population in this study?

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To estimate the average weight of apples in an orchard, a researcher picks 50 apples from different trees throughout the orchard and weighs them.

What is the sample and population in this study?

The sample is the 50 apples that were picked and weighed.

The population is all the apples in the orchard.

QUESTION

A hotel manager wants to estimate the average length of stay for guests at the hotel. She reviews the records of 500 randomly selected guests from the past month and calculates their average length of stay.

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What is the sample and population in this study?

The sample is the 500 guests whose length of stay was reviewed.

The population is all guests who stayed at the hotel during the past month.

QUESTION

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Is this a statistic or a parameter?

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Is this a statistic or a parameter?

This average annual salary of \$65,000 is a parameter because it describes the average salary of the entire population of employees within the company.

QUESTION

A survey conducted by a market research firm interviews 200 randomly selected employees from various companies in a city. The survey finds that the average commute time for these employees is 30 minutes.

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Is this a statistic or a parameter?

This average commute time of 30 minutes is a statistic because it is calculated from the sample of 200 employees.

CENSUS

Parameter

SURVEY

Statistic

CATEGORICAL DATA

Categorical (qualitative) data are pieces of information that allow us to classify the objects under investigation into various categories

QUANTITATIVE DATA

Quantitative data are responses that are numerical in nature and with which we can perform meaningful arithmetic calculations.

EXAMPLE

A researcher is conducting a study on the favorite colors of people in a community. She collects responses from 100 people, and the colors reported are red, blue, green, and yellow.

The data is **qualitative** because it describes categories of colors rather than numeric measurements.

EXAMPLE

An online bookstore tracks the number of books sold each month. In January, they sold 150 books, in February 200 books, and in March 175 books.

The data is **quantitative** because it consists of numerical values representing the number of books sold.

EXAMPLE

A company surveys its employees about their job satisfaction. The responses include categories such as "Very Satisfied," "Satisfied," "Neutral," "Dissatisfied," and "Very Dissatisfied."

The data is **qualitative** because it describes different levels of satisfaction using categorical responses.

EXAMPLE

A hospital records the number of patients admitted each day. On Monday, there were 30 patients, on Tuesday, 45 patients, and on Wednesday, 40 patients.

The data is **quantitative** because it involves numerical values representing the number of patients admitted.

QUESTION

A tourist attraction logs the different countries from which visitors come, such as France, Japan, Brazil, and Canada.

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Is the data qualitative or quantitative?

The data is **qualitative** because it categorises visitors based on their countries of origin, without using numerical values.

QUESTION

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A company records the number of new hires each month. The counts for the past three months are 8, 12, and 10 new hires.

Is the data qualitative or quantitative?

The data is quantitative because it consists of numerical values representing the number of new hires each month.

QUESTION

A research study measures the daily water intake of participants in liters. The recorded intakes are 1.5 liters, 2.0 liters, and 2.5 liters.

Is the data qualitative or quantitative?

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Is the data qualitative or quantitative?

The data is quantitative because it consists of numerical values representing the amount of water consumed.

QUESTION

A librarian categorizes books in the library by genre, such as fiction, non-fiction, mystery, and science fiction.

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A librarian categorizes books in the library by genre, such as fiction, non-fiction, mystery, and science fiction.

Is the data qualitative or quantitative?

The data is qualitative because it classifies books into different genres without using numerical values.

QUESTION

A company assigns employee ID numbers to its staff for identification purposes. One employee has the ID number 12345.

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A company assigns employee ID numbers to its staff for identification purposes. One employee has the ID number 12345.

Is the data qualitative or quantitative?

The data is qualitative because the employee ID number is used as a categorical identifier for individuals rather than for numerical analysis or measurement. Although it consists of numbers, it serves to distinguish between employees rather than to represent a measurable quantity.

QUESTION

A city uses zip codes to organize mail delivery. The zip code 30301 is assigned to a particular neighborhood.

Is the data qualitative or quantitative?

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A city uses zip codes to organize mail delivery. The zip code 30301 is assigned to a particular neighborhood.

Is the data qualitative or quantitative?

The data is qualitative because the zip code 30301 is used as a categorical identifier for a specific geographic area. Although it consists of numbers, it functions as a label to categorise locations rather than a numerical value for calculations or measurements.