

Student name: _____

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

A population is a collection of all individuals, objects, or measurements of interest.

true

false

Statistics are used as a basis for making decisions.

true

false

A listing of 100 family annual incomes is an example of statistics.

true

false

The average number of passengers on commercial flights between Chicago and New York City is an example of a statistic.

true

false

Statistics is used to report the summary results of market surveys.

true

false

A sample is a portion or part of the population of interest.

true

false

To infer something about a population, we usually take a sample from the population.

true

false

Descriptive statistics are used to find out something about a population based on a sample.

true

false

There are four levels of measurement: qualitative, quantitative, discrete, and continuous.

true

false

The ordinal level of measurement is considered the "lowest" level of measurement.

true

false

A store asks shoppers for their zip codes to identify market areas. Zip codes are an example of ratio data.

true

false

An ordinal level of measurement implies some sort of ranking.

true

false

Data measured on a nominal scale can only be classified into categories.

true

false

The terms descriptive statistics and inferential statistics can be used interchangeably.

true

false

A marketing research agency was hired to test a new DVD player. Consumers rated it outstanding, very good, fair, or poor. The level of measurement for this experiment is ordinal.

true

false

The Union of Electrical Workers of America with 9,128 members polled 362 members about a new wage package that will be submitted to management. The population is the 362 members.

true

false

The *CIA World Factbook* cited these numbers for the United States:

- The birthrate is 13.66 births per 1,000 of the population.
- The average life expectancy for females is 81.17 years.
- Approximately 316.7 million people reside in the United States.

Each of these numbers is referred to as a statistic.

true

false

If we select 100 people from 25,000 registered voters and question them about candidates and issues, the 100 people are referred to as the population.

true

false

Statistics is defined as a body of techniques used to facilitate the collection, organization, presentation, analysis, and interpretation of information for the purpose of making better decisions.

true

false

Categorizing voters as Democrats, Republicans, and Independents is an example of interval level measurement.

true

false

The order in which runners finish in a race would be an example of continuous data.

true

false

Based on a sample of 3,000 people, the civilian unemployment rate in the United States was 5.5%. The 5.5% is referred to as a statistic.

true

false

The principal difference between the interval and ratio scale is that the ratio scale has a meaningful zero point.

true

false

The branch of mathematics used to facilitate the collection, organization, presentation, analysis, and interpretation of numerical information is referred to as statistics.

true

false

The number of children in a family is a discrete variable.

true

false

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

The main purpose of descriptive statistics is to

- summarize data in a useful and informative manner.
- make inferences about a population.
- determine if the data adequately represent the population.
- gather or collect data.

Which of the following is an example of a continuous variable?

- Tons of concrete to complete a parking garage
- Number of students in a statistics class
- Zip codes of shoppers
- Rankings of baseball teams in a league

The incomes of 50 loan applicants are obtained. Which level of measurement is income?

- Nominal
- Ordinal
- Interval
- Ratio

When TV advertisements report that "2 out of 3 dentists surveyed indicated they would recommend Brand X toothpaste to their patients," an informed consumer may question the conclusion because

- the sample was only 5 dentists.
- the sample of dentists is clearly explained.
- the advertisement does not include the total number of dentists surveyed.
- the conclusion is not illustrated with a graph.

A bank asks customers to evaluate its drive-through service as good, average, or poor. Which level of measurement is this classification?

Nominal

Ordinal

Interval

Ratio

A portion or part of a population is called a
random survey.

sample.

tally.

frequency distribution.

If Gallup, Harris, and other pollsters asked people to indicate their political party affiliations as Democrat, Republican, or Independent, the data gathered would be an example of which scale of measurement?

Nominal

Ordinal

Interval

Ratio

The members of each basketball team wear numbers on their jerseys. What scale of measurement are these numbers considered?

Nominal

Ordinal

Interval

Ratio

A marketing class of 50 students evaluated the instructor using the following scale: superior, good, average, poor, or inferior. The descriptive summary showed the following survey results: 2% superior, 8% good, 45% average, 45% poor, and 0% inferior.

The instructor's performance was great!

The instructor's performance was inferior.

Most students rated the instructor as poor or average.

No conclusions can be made.

A survey includes a question about marital status that has the following responses: single, married, divorced, separated, or widowed. What is the level of measurement for this question?

Ratio

Interval

Ordinal

Nominal

Respondents were asked, "Do you now earn more than or less than you did five years ago?"
What is this level of measurement?

Interval

Ratio

Nominal

Ordinal

Which word is *not* part of the definition of descriptive statistics?

Organizing

Summarizing

Presenting

Predicting

The reported unemployment is 5.5% of the population. What level of measurement is used to measure unemployment?

Nominal

Ordinal

Interval

Ratio

A survey asked respondents to classify themselves by religion and national origin. Which level of measurement is this?

Nominal

Ordinal

Interval

Ratio

What level of measurement is the Centigrade temperature scale?

Nominal

Ordinal

Interval

Ratio

What type of variable is the number of gallons of gasoline pumped by a filling station during a day?

Qualitative

Continuous

Attribute

Discrete

The performance of personal and business investments is measured as a percentage called "return on investment." What type of variable is "return on investment"?

Qualitative

Continuous

Attribute

Discrete

What type of variable is the number of robberies reported in your city?

Attribute

Continuous

Quantitative

Qualitative

What type of variable is the number of auto accidents reported in a given month?

Qualitative

Categorical

Continuous

Discrete

The names of the positions in a corporation, such as chief operating officer or controller, are examples of what type of variable?

Qualitative

Quantitative

Discrete

Continuous

What type of variable is "pounds of popcorn" served at a movie theater?

Qualitative

Categorical

Discrete

Continuous

The final rankings of the top 20 NCAA college basketball teams are an example of which level of measurement?

Nominal

Ordinal

Interval

Ratio

Your height and weight are examples of which level of measurement?

Nominal

Ordinal

Interval

Ratio

Shoe style is an example of what level of measurement?

Nominal

Ordinal

Interval

Ratio

The general process of gathering, organizing, summarizing, analyzing, and interpreting data is called

statistics.

descriptive statistics.

inferential statistics.

levels of measurement.

The Nielsen Ratings break down the number of people watching a particular television show by age. What level of measurement is age?

Nominal

Ordinal

Interval

Ratio

An example of a qualitative variable is

number of children in a family.

weight of a person.

color of ink in a pen.

miles between oil changes.

Which one of the following is *not* an example of discrete data?

Number of households watching the Home Shopping Network

Number of employees reporting in sick

Number of miles between New York City and Chicago

Number of members of the Denver Lions Club

What level of measurement is a person's "favorite sport"?

Ratio

Ordinal

Interval

Nominal

A group of women tried five brands of fingernail polish and ranked them according to preference. What level of measurement is this?

Nominal

Ordinal

Interval

Ratio

A university wishes to conduct a student survey. In one of the questions, students are asked to mark their class standing as freshman, sophomore, junior, or senior. Class standing is an example of the

ordinal scale.

nominal scale.

ratio scale.

interval scale.

Income is a variable often used in business and economics. Income is an example of a variable that uses the

ordinal scale.

nominal scale.

ratio scale.

interval scale.

When statisticians analyze sample data in order to draw conclusions about the characteristics of a population, this is referred to as

descriptive statistics.

statistical inference.

data analysis.

data summarization.

The length of a bridge, measured in meters, is an example of categorical data.

either categorical or quantitative data.

measurement data.

quantitative data.

Ethical statisticians

ensure that statistical reports and conclusions match desired findings even if the data do not support this.

use honesty and integrity when summarizing, analyzing, and interpreting data.

withhold information that does not support favored conclusions.

never mention any limitations of statistical analysis or possible sources of error when presenting reports.

The American Statistical Association

has no approved ethical standards for statisticians.

encourages statisticians to mislead people when reporting findings and results.

advises statisticians to “lie with statistics.”

has guidelines which advise statisticians to maintain ethical standards.

Which of the following is *true*?

Data is collected and analyzed for you by computer programs, so there is no need to understand statistics.

Statistical techniques are only useful for certain professions.

No matter what your career, you need a knowledge of statistics to understand the world.

Statistics is never required to make personal decisions.

Which of the following is *not* an example of a statistic?

A list of the profits earned last year for 100 companies in the United States

The average profit earned last year for the 10 top companies on the Dow Jones Index

The weekly income of the typical high school graduate compared to the typical college graduate

The unemployment rate in the United States for last month

Which of the following situations is *not* acceptable when presenting findings?

Explaining why a part of data set was excluded

Changing the date of reporting so that the quarterly earnings are above projections

Identifying the possible bias created by the sampling method chosen

Including assumptions made in the execution and interpretation of the data and analysis.

Answer Key

Test name: Ch1_Statistical Techniques in Business and Economics_19e

TRUE

This is the definition of a population.

TRUE

This is the ultimate purpose of statistics. After we organize, summarize, and analyze data, we make decisions based on our summaries and analysis.

FALSE

A listing of incomes is raw data. Statistics is used to organize, summarize, and present the data.

TRUE

Statistics is used to organize, summarize, and analyze raw data. Raw data would be a list of all commercial flights between the two cities and the number of passengers on each, while statistics would take that raw data and create summary measures, such as determining the mean or average for these flights.

TRUE

Statistics is used to summarize raw data into a more useful form. While we could look at all the individual survey results, summarizing the results is helpful if we wish to make decisions.

TRUE

This is the definition of a sample.

TRUE

This is the purpose of inferential statistics, where we estimate or infer something about a population based on a sample taken from that population.

FALSE

Inferential statistics uses sample information to find out something about a population.

FALSE

The four levels of measurement are nominal, ordinal, interval, and ratio.

FALSE

The nominal scale is the "lowest" level of measurement.

FALSE

While zip codes use numbers, they are only labels. Therefore, they represent a nominal measurement scale.

TRUE

If qualitative data can be ranked on a relative basis, it is ordinal rather than nominal. An example of the ordinal level would be a survey in which service is classified as poor, average, or exceptional.

TRUE

Nominal level data can only be put into categories. An example would be car color: you can create a list of colors, but the order in which the color is presented is not relevant. In contrast, qualitative data that can be put into ordered categories based on some sort of ranking is at the ordinal level. An example would be a survey in which service is classified as poor, average, or exceptional.

FALSE

Descriptive statistics are used to organize, summarize, and present data. Inferential statistics use sample information to make inferences about a population.

TRUE

Qualitative data that can be put into ordered categories based on some sort of ranking is ordinal level. In this case, outstanding is superior to very good, very good is superior to fair, and fair is superior to poor.

FALSE

The 362 members are a sample or portion of the population of 9,128 union members.

TRUE

Statistics are numbers used to communicate a piece of information. Each of the statistics provided in this list is a summary of the data for the population as a whole.

FALSE

The 100 people are a sample or portion of the population of 25,000 registered voters.

TRUE

This is the definition of the term statistics.

FALSE

Political party is a label that corresponds to a nominal level of measurement.

FALSE

The order in which runners finish a race is an example of an ordinal level of measurement and is discrete data.

TRUE

The unemployment rate is a single summary statistic used to convey information about the population as a whole.

TRUE

This is the principal difference between interval and ratio level data. Interval level data has no true zero, so zero is just a point on a scale rather than the absence of something. Ratio level data has a true zero point, so zero means the absence of something. If you have a zero balance in your savings account, it means you have no money saved.

TRUE

This is another possible definition of statistics.

TRUE

Discrete variables have gaps between the values. A family will have zero, one, two, or more children. An individual family cannot have values between those gaps, such as 1.5 children.

A

Descriptive statistics summarize existing data. It does not collect new data or draw conclusions about a population.

A

A continuous variable assumes any value within a range. Numbers of students, zip codes, and rankings have "gaps" between the values, thus are not continuous.

D

Incomes are measured on a ratio scale because the variable has a zero point (no income) and the ratio between two values is meaningful.

C

The ad implies that most dentists would recommend the product. However, without knowing anything about how many dentists were selected, and how they were selected, it would be difficult to accept the results of the survey.

B

Ordinal is the correct answer because a "good" response is better than an "average" one. However, the difference between the responses is not a constant size.

B

A sample is a subset of a population of interest.

A

Political party affiliation is measured with a label or name and therefore is nominal. It is a categorization with no natural order and cannot be ranked or ordered.

A

Jersey numbers are labels for identification purposes only. These labels have no natural order and cannot be ranked or ordered.

C

The percentages indicate that 90% of the 50 students rated the instructor as average or poor. No students rated the instructor as inferior. "Great" was not measured.

D

Marital status is nominal because it has no natural order and cannot be ranked or ordered.

C

The survey asks for a relative measure of income today in comparison to five years ago. The response is either "more" or "less." There is no absolute measure of income to compute how much more or less is earned, and therefore this is a nominal level of measurement.

D

In descriptive statistics, we organize, summarize, and present data. We do not predict.

D

Unemployment percentages have a true zero point (no unemployment), and the ratio between two values is meaningful. Consequently, this is ratio level data.

A

Religion and national origin are labels with no natural order and cannot be ranked or ordered.

C

Temperature can be ranked and the distance between temperatures can be computed, but there is no natural value of zero on the Centigrade scale.

B

The number of gallons pumped is a numerical variable that can assume any value within a range. There are no gaps in the scale, so the data are continuous.

B

"Return on investment" can assume any value within a range. There are no gaps in the scale, so the data are continuous.

C

The number of robberies is counted and must be a whole number, such as 0, 500, or 3,125,874.

D

The number of auto accidents is counted and must be a whole number, such as 0, 500, or 3,125,874.

A

The variable, job title, is qualitative.

D

"Pounds of popcorn" can assume any value within a range, and there are no gaps in the scale.

B

While the rankings indicate which team is better than another, they do not measure how much better a team is relative to another.

D

Height and weight are ratio variables that have a zero point, and the ratio between two values is meaningful.

A

Shoe style is a nominal variable because it is a label with no natural order and cannot be ranked or ordered.

A

Statistics is the science of collecting, organizing, presenting, analyzing, and interpreting data to assist in making more effective decisions.

D

Age is a ratio variable because it has a zero point, and the ratio between two values is meaningful.

C

Color is a qualitative variable because it is an attribute that can be observed but not measured.

C

Discrete variables can assume only certain values, and there are gaps between the values. Miles are not discrete because they can be measured with any number of decimal point values.

D

The variable, a person's "favorite sport," is a label with no natural order and cannot be ranked or ordered.

B

The rankings are ordinal. While the rankings indicate which brand is preferred over another, they do not measure how much more they are preferred.

A

Class standing is an ordinal variable as the data are ranked from freshman to senior.

C

Income has a meaningful zero and the ratio between two values is meaningful, so it is ratio level data.

B

This is the definition of statistical inference, in which we infer population parameters based on a sample taken from that population.

D

Measurements are quantitative data because the results are numerical, and the numbers have meaning. Qualitative data is based on counting how many items fall into particular categories or classifications. An example would be counting the number of students in a class with various eye colors.

B

The ethical practice of statistics requires that one uses honesty and integrity when summarizing, analyzing, and interpreting data. Reporting only data that matches your desired findings, withholding unfavorable information, or not being honest about limitations of your analysis or possible sources of error are not ethical practices.

D

In April of 2018, the American Statistical Association approved “Ethical Guidelines for Statistical Practice.” The Association advises us to “do the right thing” when collecting, organizing, summarizing, analyzing, and interpreting data and information. The guidelines also indicate that statisticians maintain an independent and principled point-of-view when analyzing and reporting findings and results. Using reports to lie or mislead people would be violations of these ethical guidelines.

C

There are at least three reasons for studying statistics: 1) data are collected everywhere and require statistical knowledge to make the information useful, 2) statistical techniques are used to make professional and personal decisions, and 3) no matter what your career, you will need a knowledge of statistics to understand the world and to be conversant in your career. An understanding of statistics and statistical methods will help you make more effective personal and professional decisions.

A

A list of profits earned is raw data, not a statistic. Unless the data collected for the 100 companies is organized, analyzed, or summarized in some way, it is just raw data.

B

The ethical practice of statistics requires that one uses honesty and integrity when summarizing, analyzing, and interpreting data. Reporting only data that matches your desired findings, withholding unfavorable information, or not being honest about limitations of your analysis or possible sources of error are not ethical practices.