Define statistics.

Choose the correct answer below.

- **A.** Statistics is the science of manipulating, reorganizing, and editing information to produce the desired results. In addition, statistics is about providing the required answer with the desired level of confidence.
- **B.** Statistics is the science of collecting, organizing, summarizing, and analyzing information to draw a conclusion and answer questions. In addition, statistics is about providing a measure of confidence in any conclusions.

Statistics is the science of collecting, organizing, summarizing, and analyzing information to draw a conclusion and answer questions. In addition, statistics is about providing a measure of confidence in any conclusions.

It is helpful to consider this definition in four parts. The first part of the definition states that statistics involves the collection of information. The second part refers to the organization and summarization of information. The third states that the information is analyzed to draw conclusions or answer specific questions. The fourth part states that the results should be reported with some measure that represents how convinced we are that our conclusions reflect reality.

A(n) **individual** is a person or object that is a member of the population being studied.

Descriptive statistics consists of organizing and summarizing information collected, while inferential statistics uses methods that generalize results obtained from a sample to the population and measure the reliability of the results.

A(n) **statistic** is a numerical summary of a sample.

A(n) **parameter** is a numerical summary of a population.

Variables are the characteristics of the individuals of the population being studied.

Determine whether the given value is a statistic or a parameter.

A sample of professors is selected and it is found that 55% own a computer.

Choose the correct statement below.

- Parameter because the value is a numerical measurement describing a characteristic of a sample.
- Parameter because the value is a numerical measurement describing a characteristic of a population.
- **Statistic** because the value is a numerical measurement describing a characteristic of a sample.
- **Statistic** because the value is a numerical measurement describing a characteristic of a population.

Determine whether the underlined numerical value is a parameter or a statistic. Explain your reasoning.

A certain zoo found that 8% of its 843 animals were nocturnal.

Choose the correct answer below.

- **A.** Parameter, because the data set of all 843 animals in a zoo is a sample.
- **B.** Statistic, because the data set of all 843 animals in a zoo is a population.
- **C.** Statistic, because the data set of a sample of animals in a zoo is a sample.
- **D.** Parameter, because the data set of a sample of animals in a zoo is a sample.
- **E.** **Statistic**, because the data set of a sample of animals in a zoo is a population.
- **F.** Parameter, because the data set of all 843 animals in a zoo is a population.
- **G.** Parameter, because the data set of a sample of animals in a zoo is a sample.
- **H.** **Statistic**, because the data set of all 843 animals in a zoo is a sample.
Determine whether the underlined numerical value is a parameter or a statistic. Explain your reasoning.

The average annual salary of 50 of a company’s 800 employees is $54,000.

Choose the correct answer below.

- A. Parameter, because the data set of all employees’ salaries is a sample.
- B. Statistic, because the data set of salaries of 50 employees is a population.
- C. Statistic, because the data set of all employees’ salaries is a sample.
- D. Parameter, because the data set of all employees’ salaries is a population.
- E. Parameter, because the data set of salaries of 50 employees is a population.
- F. Statistic, because the data set of salaries of 50 employees is a sample.

Determine whether the underlined numerical value is a parameter or a statistic. Explain your reasoning.

For a certain movie, 72 of the 112 members of the audience were females.

Choose the correct answer below.

- A. Statistic, because the data set of all 112 audience members is a sample.
- B. Parameter, because the data set of all 112 audience members is a sample.
- C. Statistic, because the data set of all 112 audience members is a population.
- D. Parameter, because the data set of all 112 audience members is a population.

Determine whether the underlined value is a parameter or a statistic.

In a survey of 1,011 people age 50 or older, 73% agreed with the statement "I believe in life after death."

Is the value a parameter or a statistic?

- A. The value is a parameter because the 1,011 people age 50 or older are a sample.
- B. The value is a parameter because the 1,011 people age 50 or older are a population.
- C. The value is a statistic because the 1,011 people age 50 or older are a sample.

Determine whether the variable is qualitative or quantitative.

Nation of origin

Is the variable qualitative or quantitative?

- A. The variable is qualitative because it is an attribute classification.

Determine whether the variable is qualitative or quantitative.

Medal won in race

Is the variable qualitative or quantitative?

- A. The variable is qualitative because it is an attribute classification.

Determine whether the variable is qualitative or quantitative.

Number of words in a speech

Is the variable qualitative or quantitative?

- A. The variable is quantitative because it is an attribute classification.
- B. The variable is quantitative because it is a numerical measure.
Determine whether the quantitative variable is discrete or continuous.

Volume of gravel in a pile

Is the variable discrete or continuous?

☐ A. The variable is continuous because it is not countable.

Because of no finite boundary

Determine whether the quantitative variable is discrete or continuous.

Number of beats in a song

Is the variable discrete or continuous?

☐ A. The variable is discrete because it is countable.

Determine whether the quantitative variable is discrete or continuous.

Number of words in a song

Is the variable discrete or continuous?

☐ A. The variable is discrete because it is countable.

Determine whether the quantitative variable is discrete or continuous.

Temperature on a randomly selected day in your home town

Is the variable discrete or continuous?

☐ A. The variable is discrete because it is countable.

Determine whether the quantitative variable is discrete or continuous.

Number of hands folded by a player in a poker game

Is the variable discrete or continuous?

☐ A. The variable is discrete because it is countable.

Because of no ending point

Determine whether the quantitative variable is discrete or continuous.

Length of a piece of string

Is the variable discrete or continuous?

☐ A. The variable is discrete because it is countable.

Determine whether the quantitative variable is discrete or continuous.

Number of hands folded by a player in a poker game

Is the variable discrete or continuous?

☐ A. The variable is continuous because it is countable.

B. The variable is discrete because it is countable.
Determine whether the quantitative variable is discrete or continuous.

Field goals attempted by a kicker

Is the variable discrete or continuous?

○ A. The variable is discrete because it is not countable.
○ B. The variable is continuous because it is countable.
○ C. The variable is continuous because it is not countable.
○ D. The variable is discrete because it is countable.

Determine whether the quantitative variable is discrete or continuous.

Weight carried by a soldier in combat

Is the variable discrete or continuous?

○ A. The variable is continuous because it is not countable.

Determine the level of measurement of the variable.

States in a region

Choose the correct level of measurement.

○ Interval
○ Ordinal
○ Ratio
○ Nominal

Determine the level of measurement of the variable.


Choose the correct answer below.

○ Nominal
○ Interval

Determine the level of measurement of the variable.

Weight of a child: 50 lbs, 56 lbs, 62 lbs, 68 lbs, and 74 lbs

Choose the correct answer below.

○ Interval
○ Nominal
○ Ratio
○ Ordinal

Determine the level of measurement of the variable.

Assessed value of a house

Choose the correct answer below.

○ A. Nominal
○ B. Interval
○ C. Ordinal
○ D. Ratio

Determine the level of measurement of the variable.

Monthly temperatures: 62°F, 66°F, 70°F, 74°F, and 78°F

Choose the correct answer below.

○ Ratio
○ Interval
○ Ordinal
○ Nominal

Determine the level of measurement of the variable.

Eye color

Choose the correct answer below.

○ A. Ordinal
○ B. Nominal
A polling organization contacts 1528 adult women who are 30 to 70 years of age and live in the United States and asks whether or not they had received a mammogram during the past year.

What is the population in the study?

- **A.** Adult women who are 30 to 70 years of age and live in the United States.
- **B.** Adult women who are 30 to 70 years of age and have received a mammogram.
- **C.** Adult women who are 30 to 70 years of age and live in the United States and have received a mammogram.
- **D.** Adult women who are 30 to 70 years of age.

What is the sample in the study?

- **A.** Adult women who are 30 to 70 years of age.
- **B.** The 1528 adult women who are 30 to 70 years of age and have received a mammogram.
- **C.** Adult women who are 30 to 70 years of age and live in the United States.
- **D.** The 1528 adult women who are 30 to 70 years of age and live in the United States.

A quality-control manager randomly selects 20 bottles of mustard that were filled on February 19 to assess the calibration of the filling machine.

What is the population in the study?

- **A.** The 20 bottles of mustard produced in the plant.
- **B.** The 20 bottles of mustard produced in the plant on February 19.
- **C.** Bottles of mustard produced in the plant on February 19.
- **D.** Bottles of mustard produced in the plant.

What is the sample in the study?

- **A.** Bottles of mustard produced in the plant on February 19.
- **B.** The 20 bottles of mustard produced in the plant on February 19.

The data on the right relate to characteristics of high-definition televisions A through E.

Identify the individuals, variables, and data corresponding to the variables. Determine whether each variable is qualitative, continuous, or discrete.

<table>
<thead>
<tr>
<th>Setup</th>
<th>Size (in)</th>
<th>Screen Type</th>
<th>Number of Channels Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>44</td>
<td>Plasma</td>
<td>299</td>
</tr>
<tr>
<td>B</td>
<td>47</td>
<td>Plasma</td>
<td>109</td>
</tr>
<tr>
<td>C</td>
<td>57</td>
<td>Projection</td>
<td>422</td>
</tr>
<tr>
<td>D</td>
<td>54</td>
<td>Plasma</td>
<td>270</td>
</tr>
<tr>
<td>E</td>
<td>48</td>
<td>Projection</td>
<td>289</td>
</tr>
</tbody>
</table>

What are the individuals being studied?

- **A.** Televisions with screen sizes between 40 in and 60 in.
- **B.** The characteristics of high-definition televisions A through E.
- **C.** Plasma and projection widescreen high-definition televisions.
- **D.** Television setups that include more than 100 channels.

What are the variables and their corresponding data being studied?

- **A.** Size (44, 47, 57, 54, 48), screen type (Plasma, Plasma, Projection, Plasma, Projection), and number of channels available (239, 109, 422, 270, 289)

Determine whether each variable is qualitative, continuous, or discrete.

- **Size** is a **continuous** variable.
- **Screen type** is a **qualitative** variable.
- **Number of channels available** is a **discrete** variable.
A study conducted by researchers was designed "to determine if application of duct tape is as effective as cryotherapy in the treatment of common warts." The researchers randomly divided 70 patients into two groups. The 35 patients in group 1 had their warts treated by applying duct tape. The 35 patients in group 2 had their warts treated by cryotherapy. Once the treatments were complete, it was determined that 60% of the patients in group 1 and 40% of the patients in group 2 had complete resolution of their warts. The researchers concluded that duct tape is significantly more effective in treating warts than cryotherapy.

(a) Identify the research objective. Which of the following is correct?

- A. To determine if cryotherapy is effective in treating warts.
- B. To determine if duct tape is effective in treating warts.
- C. To determine if cryotherapy is as effective as duct tape in treating warts.
- D. To determine if duct tape is as effective as cryotherapy in treating warts.

(b) Identify the sample. Which of the following is correct?

- A. The 35 patients in group 1.
- B. All people who have warts.
- C. The total number of patients with complete resolution.
- D. The 70 patients with warts.
- E. The 35 patients in group 2.

(c) List the descriptive statistics. Which of the following is correct?

- A. 35 patients in group 2.
- B. 35 patients in group 1.
- C. 60% of patients in group 1 and 40% of patients in group 2 with complete resolution.

(d) State the conclusion of the study. Which of the following is correct?

- A. Cryotherapy is significantly more effective than duct tape in treating warts.
- B. Duct tape and cryotherapy are equally effective in treating warts.
- C. Duct tape is significantly more effective than cryotherapy in treating warts.

EXAMPLES OF NOMINAL, ORDINAL, INTERVAL AND RATIO

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

Voltage measurements of batteries: 1.5V, 3V, 4.5V, 6V, and 7.5V

a) nominal
b) ordinal
c) interval
d) ratio

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate. Livability rankings for cities

a) nominal
b) ordinal
c) interval
d) ratio
Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate. Body temperature in degrees Fahrenheit

a) nominal  
b) ordinal  
c) **interval**  
d) ratio

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate. College ranking

a) nominal  
b) **ordinal**  
c) interval  
d) ratio

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate. Car models

a) **nominal**  
b) ordinal  
c) interval  
d) ratio