1. What are the two major types of statistics? Describe them in detail.

Select the two major types of statistics.

- A. Quantitative
- B. Qualitative
- C. Descriptive
- D. Inferential

(1) ______ statistics consists of organizing and summarizing information collected, while (2) ______ statistics uses methods that generalize results obtained from a sample to the population and measure the reliability of the results.

- (1) O Inferential (2) O inferential
 - 🔘 Descriptive 🛛 🔘 qualitative
 - Quantitative O quantitative
 - Qualitative O descriptive
- 2. Define the following terms.
 - a. Observational study b. Designed experiment

a. Choose the correct answer below.

○ A. In an observational study, researchers look at all the members of the group being studied.

- B. In an observational study, researchers simply observe characteristics and take measurements, as in a sample survey.
- C. In an observational study, researchers impose treatments and controls and then observe characteristics and take measurements.
- **b.** Choose the correct answer below.
- O A. In a designed experiment, researchers simply observe characteristics and take measurements, as in a sample survey.
- O B. In a designed experiment, researchers impose treatments and controls and then observe characteristics and take measurements.
- C. In a designed experiment, researchers look at all the members of the group being studied.
- 3. Classify the study as either descriptive or inferential. Explain your answer.

Data from a sample of citizens of a certain country yielded the following estimates of average TV viewing time per month for all citizens 2 years old and older. The times are in hours and minutes; Q1 stands for first quarter.

Viewing method	Q1 2011	Q1 2010	Change (%)
Watching TV in the home	158:53	158:16	0.4
Watching timeshifted TV	10:17	9:59	3.0
DVR playback	26:15	25:30	2.9
Using the Internet on a computer	25:05	25:21	- 1.1
Watching video on Internet	4:42	3:15	44.6
Mobile subscribers watching video	4:57	3:01	64.1
on a mobile phone			

Is the study descriptive or inferential?

○ A. The study is descriptive, because the statistics are used to make an inference about the population.

O B. The study is inferential, because the statistics are used to describe the sample.

○ C. The study is descriptive, because the statistics are used to describe the sample.

○ D. The study is inferential, because the statistics are used to make an inference about the population.

4. Classify the study as either descriptive or inferential. Explain your answer.

The table below shows data on average professional athletes' salaries for the years 2005 and 2011.

	Average salary (\$millions)		
Sport	2005	2011	
Baseball (MLB)	2.48	3.31	
Basketball (NBA)	4.04	5.15	
Football (NFL)	1.40	1.90	

Is the study descriptive or inferential?

- 🔾 A. The study is inferential, because the statistics are used to make an estimate of the average salaries of all professional athletes.
- 🔘 B. The study is descriptive, because the statistics are used to make an estimate of the average salaries of all professional athletes.
- C. The study is descriptive, because the statistics are a summary of the average salaries of professional athletes in three sports.
- O. The study is inferential, because the statistics are a summary of the average salaries of professional athletes in three sports.
- 5. Classify the study as either descriptive or inferential. Explain your answer.

A company provides an online database that provides real estate information for homes that are for rent or sale in a certain country. It also presents statistics on recently sold homes. The following table gives various information on all homes sold in several different cities in the country for one month.

City	Price per square foot	Sale to list price ratio	% foreclosure re-sales
Α	\$167	0.978	12.39%
В	\$439	0.988	3.08%
С	\$645	1.017	6.38%
D	\$ 78	1.000	19.77%
E	\$113	0.973	18.14%

Is the study descriptive or inferential?

- O A. The study is inferential, because the table is a summary of the data that was collected.
- **B.** The study is inferential, because the data was used to estimate averages for the population in each of the cities.
- O C. The study is descriptive, because the data was used to estimate averages for the population in each of the cities.
- O D. The study is descriptive, because the table is a summary of the data that was collected.

6.	A recent article postulated that support for a certain scientist's theories	Education	Percentage
	increases with level of education.	Postgraduate education	65%
	The table shown to the right provides percentages of a certain country's adults, by educational level, who believe that evolution is a	College graduate	52%
		Some college education	32%
	scientific theory well supported by evidence. Complete parts a and b.	High school or less	20%

a. Do you think that this study is descriptive or inferential? Explain your answer.

- O A. The study is inferential because a sample was taken.
- O B. The study is descriptive because it involves percentages.
- C. The study is inferential because a sample was used to make an inference about the population.
- O D. The study is descriptive because it is a summary of the opinions of a sample of adults.

b. If, in fact, the study is inferential, identify the sample and population.

- A. The sample is the adults who were interviewed. The population is the country's adult population.
- O B. The sample is adults who believe that evolution is a scientific theory well supported by evidence. The population is the adults who were interviewed.
- C. The study is descriptive.

7. A nationwide survey of 1000 adults found that 50% of respondents favored a plan to break up the 12 megabanks, which then controlled about 69% of the banking industry. Complete parts (a) and (b) below.

a. Identify the population and sample for this study. Choose the correct answer below.

- O A. The population is all adults in the country. The sample is the 1000 adults surveyed.
- B. The population is all adults in the country. The sample is those adults who favored breaking up the megabanks.
- **C.** The population is all adults in the country who favored breaking up the megabanks. The sample is the 1000 adults surveyed.
- D. The population is the 1000 adults surveyed. The sample is those adults who favored breaking up the megabanks.

b. Is the percentage provided a descriptive statistic or an inferential statistic? Explain your answer.

- A. The percentage is a descriptive statistic, since it summarizes information about how much of the population favors breaking up the megabanks.
- **B.** The percentage is a descriptive statistic, since it summarizes information about how much of the sample favors breaking up the megabanks.
- C. The percentage is an inferential statistic, since it draws a conclusion about how much of the sample favors breaking up the megabanks.
- O D. The percentage is an inferential statistic, since it draws a conclusion about how much of the population favors breaking up the megabanks.

8. A report stated that "55% of people between the ages of 40 and 54 oppose foreign military interventions." The percentage of 55% was computed from sample data. Complete parts (a) through (d) below.

a. Identify the population under consideration.

The population is (1) _____

b. Identify the sample under consideration.

The sample is (2) _____

- c. Is the statement in quotes descriptive or inferential? Choose the correct answer below.
- A. The statement is inferential, since it draws a conclusion about the population based on the percentage who oppose foreign military interventions.
- O B. The statement is descriptive, since it summarizes information about the population.
- C. The statement is descriptive, since it summarizes information about the sample.
- O **D.** The statement is inferential, since it draws a conclusion about the population based on a sample.

d. If you wanted to make it clear that the percentage of 55% was computed from sample data, how would you rephrase the statement in quotes?

- A. "55% of those surveyed who oppose foreign military interventions are between the ages of 40 and 54."
- O B. "55% of all people oppose foreign military interventions."
- C. "55% of those surveyed between the ages of 40 and 54 oppose foreign military interventions."
- O D. "55% of those surveyed oppose foreign military interventions."
- (1) O all people who oppose foreign military interventions.
 - all adults.
 - O all people between the ages of 40 and 54 who were surveyed.
 - O all people between the ages of 40 and 54.
- (2) O all people who oppose foreign military interventions.
 - O all people between the ages of 40 and 54 who were surveyed.
 - O all people who were surveyed who oppose foreign military interventions.
 - O all people between the ages of 40 and 54.

9. In sampling, explain why obtaining a representative sample is important.

Why is obtaining a representative sample important?

- A. The sample must be representative in order to be considered a simple random sample.
- O B. The sample must be representative in order to establish causation rather than only reveal association.
- C. The sample must be representative in order to use inferential statistics to draw conclusions about the entire population.
- O D. The sample must be representative in order to be used as part of a designed experiment rather than an observational study.

10. Suppose a famous person reads every 15th letter of the 40 thousand letters coming in weekly. What type of sampling design is the person using in this case? Explain your answer.

What type of sampling is used?

- A. The person is using simple random sampling because a random letter is chosen each week.
- B. The person is using systematic sampling because the sample is chosen using a fixed periodic interval.
- O C. The person is using stratified sampling, where the strata are the days of the week.
- O D. The person is using cluster sampling, where each week is a cluster of letters.
- E. The person is using convenience sampling because the letter chosen is the easiest one to get.
- 11. During one semester, Professor Hassett wanted to sample the attitudes of the students taking college algebra at his school, Arizona State University. He decided to interview 15 of the 728 students enrolled in the course. Use this information to answer the question.

Click here to view the StatCrunch data set.

What is the main goal of a sample? Choose the correct answer.

A. To be as small as possible

- O B. To save time and money
- C. To be representative of the population
- O **D**. To be as large as possible
- 12. a. In a designed experiment, what are the experimental units?b. If the experimental units are humans, what term is often used in place of experimental unit?
 - a. Choose the correct answer below.
 - A. The group receiving placebo
 - O B. The individuals or items on which the experiment is performed
 - C. The experimental conditions
 - O D. The group receiving the specified treatment

b. Choose the correct answer below.

- O Factor
- Treatment
- O Placebo
- Subject

13. Which type of variable yields nonnumerical data?

Choose the correct answer below.

- Discrete variable
- Qualitative variable
- Quantitative variable
- Continuous variable

14. The U.S. Geological Survey monitors and reports on earthquakes, providing daily real-time, worldwide earthquake lists. Some of the information for four of the 105 earthquakes of magnitude 1.5 or greater that occurred on May 10, 2013, is shown in the following table. Magnitude is given on the Richter scale and NST stands for the number of stations that reported the activity on the same earthquake. Complete parts (a) through (e) below.

Time	Magnitude	Depth (km)	NST	Region
01:30:17	1.5	98.6	22	Alaska
19:16:03	2.1	16.9	17	California
20:49:27	5.1	65.6	428	Guatemala
22:18:26	1.9	109.4	38	Alaska

a. Identify the type of data provided by the information in the first column of the table. Also identify the variable under consideration.

(1) _____ (2) _____

b. Identify the type of data provided by the information in the second column of the table. Also identify the variable under consideration.

(3) _____ (4) _____

c. Identify the type of data provided by the information in the third column of the table. Also identify the variable under consideration.

(5) _____ (6) _____

d. Identify the type of data provided by the information in the fourth column of the table. Also identify the variable under consideration.

(7) _____ (8) _____

e. Identify the type of data provided by the information in the fifth column of the table. Also identify the variable under consideration.

(9) _____ (10) _____

(1) O Quantitative, Discrete,

Quantitative, Continuous,

Qualitative,

(2) O number of stations reporting the earthquake O magnitude of the earthquake on the Richter scale

time at which the earthquake occurred

O region where the earthquake occurred

O depth of the earthquake in kilometers

(3) O Quantitative, Continuous,

- O Quantitative, Discrete,
 - O Qualitative,
- (4) O number of stations reporting the earthquake
- O time at which the earthquake occurred
- O region where the earthquake occurred
- O magnitude of the earthquake on the Richter scale
- O depth of the earthquake in kilometers

(5) O Quantitative, Discrete,

O Quantitative, Continuous,

- Qualitative,
- (6) O time at which the earthquake occurred
- O depth of the earthquake in kilometers
- region where the earthquake occurred
- number of stations reporting the earthquake
- O magnitude of the earthquake on the Richter scale

 Quantitative, Continuous, Quantitative, Discrete, Qualitative, 				
 (8) region where the earthquake occurre depth of the earthquake in kilometers number of stations reporting the eart magnitude of the earthquake on the 	ed s hquake Richter sc	time at which the e	arthquake oc	curred
 (9) Quantitative, Continuous, Quantitative, Discrete, Qualitative, 				
 (10) depth of the earthquake in kilometer time at which the earthquake occur number of stations reporting the earthquake on the magnitude of the earthquake on the 	ers red rthquake e Richter s	 region where the cale 	earthquake o	ccurred
 The Celebrity Net Worth website listed "T the highest earning dead celebrities are a ¹ Click the icon to view the table of dead 	The 13 Hig as shown i celebrity e	hest Earning Dead Celebritic in the accompanying table. C earnings.	es" in an articl complete parts	e in 2017. According to the article, some of s (a) through (c) below.
a. Identify the type of data provided by the	ne informat	tion in the first column of the	table. Also ide	entify the variable under consideration.
The data are (1) The va b. Identify the type of data provided by the The data are (3) The va c. Identify the type of data provided by the	ariable is (ne informat ariable is (ne informat	2) tion in the second column of 4) tion in the third column of the	the table. Also table. Also ic	o identify the variable under consideration. Tentify the variable under consideration.
The data are (5) The va	ariable is (6)		
1: Dead Celebrity Earnings	-			
	Rank	Name	Year of Dea	th
	1	Michael Jackson	2009	
	3	Charles Schulz	2000	
	5	Bob Marley	1981	
	0		2017	
	9 10	Albert Finstein	1900	
	10	David Bowie	2016	
	13	Bettie Page	2008	
(1) \bigcirc supplitutive and continuous	(2)	the real of the colourity	(2)	
$(1) \cup $ quantitative and continuous.	(2) ()	the name of the celebrity	(3) ()	quantitative and continuous. qualitative
\bigcirc qualitative and discrete.	0	the celebrity's year of death.	. 0	quantitative and discrete.
 (4) the rank of the celebrity. the name of the celebrity. the celebrity's year of death. 	(5) ()	quantitative and continuous. quantitative and discrete.	(6) 〇	the celebrity's year of death. the rank of the celebrity.
		dualitative	()	the name of the celebrity.

16. A sample of five players on the runs batted in (RBI) leaderboards during the 2012 Major League Baseball season are listed in the following table. A batter is credited with one RBI for each run scored during one of their at-bats. Also included are the teams for which they played, their primary positions, and their heights. Identify the type of data provided by the information in each column of the table.

Player	Team	Position	RBI	Height (cm)
M. Cabrera	Detroit	3B	139	193
C. Headley	San Diego	3B	115	188
J. Willingham	Minnesota	LF	110	188
P. Fielder	Detroit	1B	108	180
B. Butler	Kansas City	DH	107	183

Identify the type of data provided by the information in each column of the table.

Player:	(1)				
Team:	(2)				
Position:	(3)				
RBI:	(4)				
Height:	(5)				
(1) () (() (() () () () () () () () () () () () () (Qualitative Quantitative, Continuous Quantitative, Discrete	(2) () () () () () () () () () () () () ()	Quantitative, Continuous Quantitative, Discrete Qualitative	(3) C C C	QualitativeQuantitative, ContinuousQuantitative, Discrete
(4) (4) (4) (4) (4) (4) (4) (4) (4) (4)	Quantitative, Continuous Qualitative Quantitative, Discrete	(5) ()	Quantitative, Continuous Qualitative Quantitative, Discrete		

17. Explain the difference between each pair of concepts.

- **a.** Frequency and relative frequency
- b. Percentage and relative frequency

a. Select the correct choice below.

- A. Frequency is the number of times a particular distinct value occurs. Relative frequency is the ratio of the frequency of two different values.
- O B. Frequency is the total number of observations in a data set. Relative frequency is the ratio of the number of times a particular distinct value occurs to the frequency.
- C. Frequency is the number of times a particular distinct value occurs. Relative frequency is the ratio of the frequency of a value to the total number of observations.
- O D. Frequency is the total number of observations in a data set. Relative frequency is the number of times a particular distinct value occurs.

b. Select the correct choice below.

- A. A relative frequency is the ratio of two percentages.
- B. A relative frequency expressed as a decimal is the same as a percentage.
- C. A relative frequency is the same as a percentage expressed as a decimal.
- O D. There is no difference between a relative frequency and a percentage.

0

Ω

Category

- 18. A simple qualitative data set has been provided. Complete parts (a) through (d) for this data set.
- Ρ R Q Q Q
- a. Determine a frequency distribution.

Category	Frequency
Р	
Q	
R	

b. Obtain a relative-frequency distribution.



c. Draw a pie chart. Choose the correct chart below.



19. Discuss the relative advantages and disadvantages of stem-and-leaf diagrams versus frequency histograms.

Q

Category

0

Select the correct answer below.

Q Category

n

○ A. Stem-and-leaf diagrams are easier to make and can contain more information than frequency histograms. However, they are not very useful for large data sets.

0

Category

- O B. Stem-and-leaf diagrams can compare quantitative data to qualitative data, unlike frequency histograms. However, they are not very useful for large data sets.
- C. Stem-and-leaf diagrams are more useful for large data sets and can display more information than frequency histograms. However, they are more difficult to construct.
- O. Stem-and-leaf diagrams provide a way to graphically compare data, unlike frequency histograms. However, they are more difficult to construct.

- 20. A simple qualitative data set has been provided. Complete parts (a) through (d) for this data set.
- A B C D E A B D C B

O C.

A 10%

B 50%

C 10%

🗖 D 10%

E 20%

 $\boldsymbol{a}.$ Determine a frequency distribution.

Category	Frequency
А	
В	
С	
D	
Е	

b. Obtain a relative-frequency distribution.

Category	Relative Frequency
А	
В	
С	
D	
E	
	(Tuna integara ar desimala De

(Type integers or decimals. Do not round.)

c. Draw a pie chart. Choose the correct chart below.



d. Construct a bar chart. Choose the correct chart below.









A 20%

B 30%

C 20%

D 20%

O D.

