

Chapter 01 - What is Statistics?

1. The *significance level* measures the proportion of the time an inference about a population will be correct in the long run.

- a. True
- b. False

ANSWER: False

2. A descriptive measure that is computed from a sample is called a statistic.

- a. True
- b. False

ANSWER: True

3. The *confidence level* is the proportion of times that an estimating procedure will be wrong in the long run.

- a. True
- b. False

ANSWER: False

4. A resort employs 3,500 managers and staff. To ascertain their employees' opinions of a proposed health insurance plan, 350 employees are surveyed at random. The proportion of the 350 employees who favor the health insurance plan represents a parameter in this scenario.

- a. True
- b. False

ANSWER: False

5. In a sample of 350 students selected from a large college of business, 25% are found to be marketing majors. The 25% is a statistic.

- a. True
- b. False

ANSWER: True

6. 35% of a sample of 300 professional baseball players indicated that their parents did not play baseball. Based on this sample, we estimate that approximately 35% of the parents of all professional baseball players did not play baseball, plus or minus 5%. This is an example of using inferential statistics.

- a. True
- b. False

ANSWER: True

7. A population is the group of all items of interest to a statistics practitioner.

- a. True
- b. False

ANSWER: True

8. A statistic is typically a known quantity while a parameter is typically an unknown quantity.

- a. True
- b. False

ANSWER: True

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9. Statistical inference is the process of making an estimate, prediction, or decision about a population based on sample data.

- a. True
- b. False

ANSWER:

True

10. A descriptive measure of a population is called a parameter.

- a. True
- b. False

ANSWER:

True

11. A descriptive measure of a sample is called a parameter.

- a. True
- b. False

ANSWER:

False

12. You take a random sample to estimate a population mean and your results have a confidence level of 80%. That means the process you used will give you correct results 80% of the time.

- a. True
- b. False

ANSWER:

True

13. A random sample of 100 students is taken at LearnAll University and it's found that their average GPA is 3.1. If this information is used to help estimate the average GPA for all students at LearnAll University, which branch of statistics was applied?

- a. Descriptive statistics
- b. Inferential statistics
- c. Sample statistics
- d. Population statistics

ANSWER:

b

14. A company has developed a new computer microprocessor whose average lifetime is unknown. In order to estimate this average, 300 microprocessors are randomly selected from a large production line and tested; their average lifetime is found to be 7 years. The 300 microprocessors represent a:

- a. parameter.
- b. statistic.
- c. sample.
- d. population.

ANSWER:

c

15. A company has developed a new engine whose average lifetime is unknown. In order to estimate this average, 100 engines are randomly selected from a large production line and tested; their average lifetime is found to be 11 years. The 11 years represents a:

- a. parameter.
- b. statistic.
- c. sample.
- d. population.

ANSWER:

b

16. A descriptive measure that is computed from a sample is called a:

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- a. parameter.
- b. statistic.
- c. population.
- d. sample.

ANSWER: b

17. A descriptive measure that is computed from a population is called a:

- a. sample.
- b. statistic.
- c. population.
- d. parameter.

ANSWER: d

18. Which of the following is a measure of the reliability of a statistical inference?

- a. A population parameter.
- b. A significance level.
- c. A descriptive statistic.
- d. A sample statistic.

ANSWER: b

19. A councilman who is running for the office of senator of a state with 3.5 million registered voters commissions a survey. In the survey, 46% of the 8,000 registered voters interviewed say they plan to vote for him. The population of interest is:

- a. the 3.5 million registered voters in the state.
- b. the 8,000 registered voters interviewed.
- c. the 46% who plan to vote for her.
- d. all the residents of the state.

ANSWER: a

20. A company has developed a new power cell and wants to estimate its average lifetime. A random sample of 650 power cells is tested and the average lifetime of this sample is found to be 315 hours. The 315 hours is the value of a:

- a. parameter.
- b. statistic.
- c. sample.
- d. population.

ANSWER: b

21. The process of using sample statistics to draw conclusions about population parameters is called:

- a. finding the significance level.
- b. calculating descriptive statistics.
- c. doing inferential statistics.
- d. calculating the confidence level.

ANSWER: c

22. Which of the following represents a population, as opposed to a sample?

- a. 2,000 respondents to a magazine survey which has 600,000 subscribers.
- b. The first 15 students in your class completing a final exam.
- c. Every fourth student to arrive at the book store on your campus.
- d. All registered voters in the state of West Virginia

ANSWER: d

23. A researcher at Florida International University (FIU) wants to estimate the average number of credits earned by students last semester at FIU. She randomly selects 750 students from last semester and finds that they averaged 13.75 credits per student. The population of interest to the researcher is:

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- a. all FIU students.
- b. all college students.
- c. all FIU students enrolled last semester.
- d. the 750 FIU students selected at random.

ANSWER:

c

24. A study is under way to determine the average height of all 63,000 adult walnut trees in a certain national forest. The heights of 950 randomly selected adult walnut trees are measured and analyzed. The sample in this study is:

- a. the average height of the 950 randomly selected adult walnut trees.
- b. the average height of all the adult walnut trees in this forest.
- c. all the adult walnut trees in this forest.
- d. the 950 adult walnut trees selected at random from this forest.

ANSWER:

d

25. A study is under way to determine the average height of all 29,000 adult pine trees in a certain national forest. The heights of 600 randomly selected adult pine trees are measured and analyzed. The parameter in the study is:

- a. the average height of the 600 randomly selected adult pine trees.
- b. the average height of all the adult pine trees in this forest.
- c. all the adult pine trees in this forest.
- d. the 600 adult pine trees selected at random from this forest.

ANSWER:

b

26. How do confidence levels compare to significance levels?

- a. Confidence levels and significance levels are both typically small.
- b. Confidence levels and significance levels are both typically large.
- c. Confidence levels are typically small and significance levels are typically large.
- d. Confidence levels are typically large and significance levels are typically small.

ANSWER:

d

27. The *significance level* of a statistical inference measures:

- a. the proportion of times a conclusion about a population will be correct.
- b. the proportion of times a conclusion about a population will be wrong.
- c. the proportion of times an estimation procedure will be correct.
- d. the proportion of times an estimation procedure will be wrong.

ANSWER:

b

28. The *confidence level* of a statistical inference measures:

- a. the proportion of times a conclusion about a population will be correct.
- b. the proportion of times a conclusion about a population will be wrong.
- c. the proportion of times an estimation procedure will be correct.
- d. the proportion of times an estimation procedure will be wrong.

ANSWER:

c

29. The owner of a large manufacturing company wishes to develop a new employee health benefits package. He selects 500 employees at random and asks them about their preferences regarding their current health benefits package. The 500 employees selected is a(n) _____.

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ANSWER: sample

30. The Human Resources Director of a large hospital wants to determine the percentage of all employees who favor a newly proposed benefits package. He selects 300 employees at random and finds that 85% approve the newly proposed package. The percentage of all employees of this company who favor the newly proposed package is a(n) _____.

ANSWER: parameter

31. The Surgeon General wanted to study malpractice litigation in Chicago. A sample of 32,000 medical records was selected from all 3.5 million patients who were discharged during the year 2011. Using the information from the sample to make conclusions about malpractice litigation in Chicago is an example of doing _____ statistics.

ANSWER: inferential

32. Each of the following is a form of doing _____ statistics: 1) presenting your data using a graph; 2) calculating the mean of your sample; and 3) organizing your data into a table.

ANSWER: descriptive

33. The Commissioner of Health in the state of New York wanted to study malpractice litigation in Albany last year. She randomly selected 53,000 medical records from the population of 2.5 million patients in Albany last year. The proportion of malpractice claims filed from the 53,000 patients is an example of a(n) _____.

ANSWER: statistic

34. The Human Resources Director at Florida Atlantic University wishes to develop an employee benefits package. To get an idea of what components of a benefits package are most important, he selects 350 employees at random and asks them for their opinions. Numerically summarizing the preferences of these 350 employees is an example of doing _____ statistics.

ANSWER: descriptive

35. The Human Resources Director at Illinois State University wishes to develop an employee pension package. To get an idea of what components of a pension package are most important, he selects 525 employees at random and asks them for their opinions. The group of all employees at ISU is known as the _____.

ANSWER: population

36. The Attorney General of the state of California wanted to study criminal law in Los Angeles last year. He randomly selected 46,000 criminal records from the population of 1.5 million convicts in Los Angeles last year. From this sample, he calculated the proportion of litigations, the average amount of money involved per litigation, and the proportion of litigations resulting in a conviction. These calculations are all examples of doing _____ statistics.

ANSWER: descriptive

37. At Cedar Rapids Community College, administrators want to determine the average commuting distance for their students who commute to school. They randomly select 250 students who commute and ask them the distance of their commute to campus. From this group a mean of 19.3 miles is computed.

- Describe/find the parameter.
- Describe/find the statistic.
- Describe the population.
- Describe the sample.

ANSWER:

- The mean commute distance for all commuting students at the college.

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- b. 19.3 miles.
- c. All commuting students enrolled at the college.
- d. The 250 randomly selected commuting students.

38. Briefly describe the difference between a parameter and a statistic, and give an example of each.

ANSWER: A parameter is a descriptive measure of a population, while a statistics is a descriptive measure of a sample.

Examples: The mean number of soft drinks consumed last week by all students at Notre Dame is a parameter; the mean number of soft drinks consumed last week by a sample of 450 students from Notre Dame is a statistic.

39. Briefly describe the difference between a population and a sample and give an example of each.

ANSWER: A population is the group of all items of interest to a statistics practitioner, while a sample is a set of data drawn from the studied population.

Examples: All students at the West Virginia University is a population, while 150 students randomly selected from West Virginia University is a sample.

40. What name do we give to a descriptive measure of a sample?

ANSWER: A statistic.

41. What name do we give to a descriptive measure of a population?

ANSWER: A parameter.

42. A manufacturer of microwave ovens wants to know what percentage of all of their microwave ovens are defective. When 450 of their microwave ovens are selected at random and examined, 0.4% are found to be defective.

- a. Describe the population of interest.
- b. Describe the sample.
- c. Describe/find the parameter.
- d. Describe/find the statistic.
- e. Is the 0.4% a parameter or a statistic in this scenario? Why?

ANSWER:

- a. All microwave ovens made by this manufacturer.
- b. The 450 microwave ovens selected at random.
- c. The proportion of all microwave ovens made by this manufacturer that are defective.
- d. The proportion of the microwave ovens from the random sample that are defective: 0.4%.
- e. The 0.4% represents the statistic, since it describes the sample.

43. A candidate who is running for the vacant City Mayor seat with 35,000 registered voters wants to determine what percentage would vote for him. His pollsters interview 600 registered voters from the city at random; 60% say they plan to vote for him.

- a. What is the population of interest?
- b. What is the sample?
- c. Is the 60% a parameter or a statistic in this scenario? Why?

ANSWER:

- a. The 35,000 registered voters in that city.
- b. The 600 registered voters selected at random.
- c. The 60% is a statistic, since it is a descriptive measure of the sample.

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44. Define each of the following statistical terms:

- a. Descriptive statistics
- b. Statistical inference
- c. Confidence level
- d. Significance level
- e. Population
- f. Sample

ANSWER:

- a. Descriptive statistics is organizing, summarizing, and analyzing data to describe a sample.
- b. Statistical inference is the process of making an estimate, prediction, or decision about a population based on sample data.
- c. The confidence level is the proportion of times that an estimating procedure will be correct.
- d. The significance level is the proportion of times that a conclusion about a population will be wrong.
- e. A population is the group of all items of interest to a statistics practitioner.
- f. A sample is a set of data drawn from the studied population.

45. Identify each of the following as a use of descriptive statistics or inferential statistics.

- a. Finding the weights of a sample of 85 manufacturer parts.
- b. Calculating the average weight of 125 boxes shipped by FedEx.
- c. Estimating the percentage of the U.S. population that will vote for your favorite candidate in the next presidential election.
- d. Selecting a random sample of 190 babies born last year and using this information to estimate the birth weight of all babies born last year.
- e. Randomly selecting 225 cans of a brand of peas and using their average weight to decide whether the 15 oz. label on the cans is truthful or not.

ANSWER:

- a. Descriptive statistics
- b. Descriptive statistics
- c. Inferential statistics
- d. Inferential statistics
- e. Inferential statistics

46. One source of data used in this chapter is the GSS. What does this acronym mean?

- a. General Social Survey
- b. General Statistical Survey
- c. Survey of Government Spending
- d. Global Science Survey

ANSWER:

a

47. One source of data used in this chapter is the SCF. What does this acronym mean?

- a. Consumer Financial Survey
- b. Survey of Consumer Finances
- c. Survey of Corporate Finances
- d. Social Census Facts

ANSWER:

b