**Population Parameters and Sample Statistics Practice Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. For each statement, identify whether the numbers underlined are statistics or parameters.

 a. Of all U.S. kindergarten teachers, 32% say that knowing the alphabet is an essential skill.

 b. Of the 800 U.S. kindergarten teachers polled, 34% say that knowing the alphabet is an essential skill.

2. Of the U.S. adult population, 36% has an allergy. A sample of 1200 randomly selected adults resulted in 33.2% reporting an allergy.

 a. Describe the population. b. What is the sample? c. Describe the variable.

 d. Identify the statistic and give its value. e. Identify the parameter and give its value.

3. In your own words, explain why the parameter is fixed and the statistic varies.

4. The admissions office wants to estimate the cost of textbooks at USC. Let the variable *x* be the total cost of all textbooks purchased by a student this semester. The plan is to randomly identify 100 students and obtain their total textbook costs. The average cost for the 100 students will be used to estimate the average cost for all students.

 a. Describe the parameter the admissions office wishes to estimate. b. Describe the population.

 c. Describe the variable involved. d. Describe the sample.

 e. Describe the statistic and how you would use the 100 data values collected to calculate the statistic.

5. Select 10 students currently enrolled at USC and collect data for these three variables. 1) Number of courses enrolled in. 2) Total cost of textbooks and supplies. 3) Method of payment used for textbooks and supplies.

 a. What is the population? b. What is the sample?

6. Suppose a 12 year old asked you to explain the difference between a sample and a population, how would you explain it to him/her? How might you explain why you would want to take a sample, rather than surveying every member of the population?

7. Television station QUE wants to know the proportion of TV owners in Virginia who watch the station’s new program at least once a week. The station asked a group of 1000 TV owners in Virginia if they watch the program at least once a week.

 a. Identify the individuals of the study and the variable. b. Do the data comprise a sample?

 c. If so, what is the underlying population?

d. Is the proportion of viewers in the sample who watch the new program at least once a week a statistic or a parameter?

8. A study reveals that there are exactly 100 Senators in the 109th Congress of the United States, and 55 % of them are Republicans.

 a. Identify the individuals of the study and the variable. b. Do the data comprise a sample or a population?

 c. Does the study represent a statistic or a parameter? d. For a set population, does a parameter ever change?

9. Identify the population and the sample:

a) A survey of 1353 American households found that 18% of the households own a computer.

b) A recent survey of 2625 elementary school children found that 28% of the children could be classified obese.

c) The average weight of every sixth person entering the mall within 3 hour period was 146 lb.

10. Determine whether the numerical value is a parameter or a statistic (and explain):

a) A recent survey by the alumni of a major university indicated that the average salary of 10,000 of its 300,000 graduates was 125,000.

b) The average salary of all assembly-line employees at a certain car manufacturer is $33,000.

c) The average late fee for 360 credit card holders was found to be $56.75.

11. Consider the students in our class as the sample and all of the students at our high school as the population. Identify the following as a parameter or a statistic.

 a. The proportion of students in our class who use instant messaging or text messaging on a daily basis.

 b. The proportion of students at our school who use instant messaging or text messaging on a daily basis.

 c. The average number of hours that students at our school spent watching television last week.

 d. The average number of hours that students in our class slept last night.

12. Identify each of the following as a parameter or a statistic. If you need to make an assumption about who or what the population is, explain your assumption.

 a. The proportion of voters who voted for President Bush in the 2004 election.

 b. The proportion of voters surveyed by CNN who voted for John Kerry in the 2004 election.

 c. The proportion of voters among our school's faculty who voted for Ralph Nader in the 2004 election.

 d. The average number of points scored in a Super Bowl game.

**Observational Study or Experiment?**

*For each situation, determine whether the research conducted is an observational study or an experiment. Explain your reasoning.*

13. Some gardens prefer to use non-chemical methods to control insect pests in their gardens. Researchers have designed two kinds of traps and want to know which design will be more effective. They randomly choose 10 locations in a large garden and place one of each kind of trap at each location. After a week, they count the number of bugs in each trap.

14. Some people who race greyhounds give the dogs large doses of vitamin C in the belief that the dogs will run faster. Investigators at the University of Florida tried three different diets in random order on each of five racing greyhounds. They were surprised to find that when the dogs ate high amounts of vitamin C, they ran more slowly.

15. A researcher studies pregnant women who smoke and studies how many of the children had birth defects.

16. An educational software company wants to compare the effectiveness of its computer animation for teaching biology with that of a textbook presentation. The company gives a biology pretest to each of a group of high school juniors, and then divides them into two groups. One group uses the animation, and the other studies the test. The company retests all students and compares the increase in biology test scores in the two groups.

 a. Is this an observational study or an experiment? Justify your answer.

 b. If the group using the computer animation has a much higher average increase in test scores than the group using the textbook, what conclusions, if any, could the company draw?

17. What is the best way to answer each of the questions below: a survey, an experiment, or an observational study? Explain your choices. For each, write a few sentences about how such a study might be carried out.

 a. Are people generally satisfied with how things are going in the country right now?

 b. Do college students learn basic accounting better in a classroom or using an online course?

 c. How long do your teachers wait on average after they ask the class a question?

18. Can special study courses actually help raise SAT scores? One organization says that the 30 students they tutored achieved an average gain of 60 points when they retook the test.

 a. Explain why this does not necessarily prove that the special course caused the scores to go up.

 b. Propose a design for an experiment that could test the effectiveness of the tutorial course.