Worksheet 5A

Population = the complete set of things or people under study

Sample = a subset of the population from which data is collected

Population parameter = a quantity that describes a characteristic of an entire population

Sample statistic = a quantity calculated from the sample used to estimate a population parameter

Sampling methods: simple random, systematic, convenience, cluster, stratified.

Two types of statistical studies: observational study, experiment (single blind, double-blind, non-blind).

For Problem 1 and 2, identify the population, sample, population parameters, and sample statistics.

1) A company wants to know the proportion of its customers who are satisfied with their service. They randomly select 500 customers and ask whether they are satisfied.

2) A higher education research organization conducts an annual study of attitudes of incoming college students by surveying approximately 250,000 first-year students at 340 colleges and universities. There are approximately 1.4 million first-year college students in this country.

3) You want to determine the average number of classes skipped by first-year students at BYUH during a particular semester. State whether each of the following samples is likely to be representative and explain why or why not.

Sample 1: The first 100 first-year students whom you meet at the Aloha Center

Sample 2: 100 first-year students who live off-campus

In Problems 4-8, identify the sampling method (simple random sampling, systematic sampling, convenience sampling, cluster sampling, or stratified sampling).

4) A librarian wants to inspect book conditions on shelves. She checks every 15th book on each shelf.

5) Student ID numbers are randomly selected by a computer for a survey of student opinions on college athletics.

6) An IRS auditor randomly selects for audits 30 taxpayers in each of the filing status categories: single, head of household, married filing jointly, and married filing separately.

7) A taste test for chips and salsa is conducted at the entrance to a supermarket.

8) A consumer report journalist wants to publish a blog about the most popular cars in the U.S. She has decided to use publicly available vehicle registration data to identify the most often registered car makes. She uses a random number generator (RNG) to pick out 4 from the list of all 50 states in the U.S. From each state, she then uses an RNG to pick two counties, and then repeats to identify two cities or towns.

In Problems 9-11, determine whether each of the studies described is observational or an experiment. If the study is an experiment, identify the control and treatment groups and discuss whether making the study single- or double-blind is necessary. If the study is observational, determine if it is a case-control study.

9) A study enrolled 2002 runners to look for relationships between specific types of running injuries and variables such as height, weight, body mass index, age, and running history.

10) Researchers study whether nighttime phone use is related to poor sleep. They compare people with sleep problems to those who sleep well, asking both groups about their nighttime phone habits.

11) Researchers test a new AI tutoring program to see if it improves math performance. Students are randomly assigned either the real program with an adaptive algorithm or an identical-looking version without it. Neither the students nor the teachers know which version each student uses until the study ends.