Unit 1- Sample Design and Basics

Due February 19

Where appropriate, use complete sentences. In each case, make complete responses.

1. In your own words, describe the difference between a population and a sample.
2. In your own words, describe the difference between a parameter and a statistic.
3. Explain why it is that we collect samples and present statistics and we do not collect population data and then present parameters.
4. State whether the following is a quantitative variable or a categorical variable. If it is quantitative, then state if it is continuous or discrete. And finally state the level of measurement that the data uses.
   1. Baseball Teams
   2. Gender
   3. Numbers of Hot Dogs
   4. Liters of Milk
   5. Zip Code
   6. Height
   7. BMI
5. Give five examples each (different from those above) of categorical and quantitative variables and discuss how you might measure them.
6. For each of the following scenarios, state what kind of sampling was used for the observational study. Explain how you know.
   1. You survey all of the people in your statistics class about whether or not they like a particular brand of soda.
   2. You take a list of all of the students at Santa Ana College and then select every 20th student in order to determine if they are on financial aid.
   3. You select 200 Latinos, 200 Caucasians, 200 African Americans and 200 Asians and then measure their height to determine if different races have different heights.
   4. You place a posting on your Facebook asking people to respond with their favorite television shows.
   5. You survey all of the individuals in 12 different math classes in order to calculate the success rates of all math students.
   6. At SAC, you select a sample to determine the average number of units taken during a particular semester, 60% of your participants are Latino, 20% are Asian, 15% are Caucasian, 4% are African American, and 1% is of other ethnicities,.
7. Explain what the treatment is for each experiment.
   1. You are testing the efficacy of a cholesterol drug in lowering cholesterol.
   2. You want to find out if the use of oolong tea causes weight loss.
   3. You are testing the effectiveness of a curriculum on students' understanding of fractions.
   4. You are testing the difference in the speed of a car on the Utah Salt Flat and the road to the Florida Keys.
8. Give three different ways to prevent experimental bias. Explain in your own words how they prevent that bias.
9. Explain in your own words what a simple random sample is and why it might be preferable to the other kinds of samples. Why might we want to use a simple random sample for experiments?

The quiz in week 2 will be on all of the information that we went over in the first week of class and what is covered in this homework.

You must be able to:

1. Define the following terms and understand their relevance to statistics:
   1. Measurement
   2. Robustness
   3. Population
   4. Sample
   5. Parameter
   6. Statistics
   7. Experiment
   8. Placebo
   9. Placebo Effect
   10. Categorical Data
   11. Quantitative Data
   12. Observational Study
   13. Simple Random Sample
   14. Treatment
   15. Representativeness
   16. Sampling Error
   17. Sampling Bias
   18. Control
   19. Randomization
   20. Replication
   21. Blinding

You should also be able to identify the kind of sampling technique (e.g. voluntary sample, strata sample, etc.) and/or the timing of the sample given a particular kind of observational study.