REVIEW SHEET FOR SESSION 1

1. Given a description of a method of selecting subjects, be able to determine the type of sampling: Simple random sampling, convenience sampling, systematic sampling, stratified sampling, cluster sampling, and bootstrap sampling.

2. Given a description of a research situation, be able to distinguish between: a prospective and retrospective study.

3. Know that descriptive statistics summarizes data, and conclusions are applied to the data that was summarized.

4. Know that in inferential statistics a sample is randomly selected from a population, and statistical results obtained from the sample are used to draw conclusion about the population.

5. Know that inferential statistics usually involves the quantification of the uncertainty, which must be considered when evaluating the conclusions.

6. Know that experiments involve random assignment of subjects to different treatment conditions in addition to random selection from a population.

7. Know that experiments provide strong evidence of causality; quasi-experiments provide some evidence of causality; and correlational studies provide weak evidence of causality.

8. Know that the same observation can occur more than once in a sample when the sample is drawn with replacement, and can only occur once when a sample is drawn without replacement.

9. Know that in a random sample each observation in the population has the same probability of being selected for the sample.

10. Know that when the sample is selected without replacement, a large population is assumed by the statistical methods used in this class.

11. Know that the symbol, \( \sum_{i=1}^{N} X_i \), describes a calculation in which all of the values in the variable, \( X \) are added together starting with the first observation (\( i = 1 \)), and continuing to the last observation \( i = N \).

12. Know that \( N \) is the number of observations in the population, and \( n \) is the number of observations in the sample.

13. Know that the mean of the population is represented by \( \mu \) which is the Greek letter m and is pronounce Mu.
14. Know that \( \mu = \frac{\sum_{i=1}^{N} X_i}{N} \)

15. Know that the **mean of the sample** is represented by \( \bar{X} \) which is pronounced X bar.

16. Know that, \( \bar{X} = \frac{\sum_{i=1}^{n} X_i}{n} \)

17. In standard **parametric statistics** quantities computed from the sample are used to make statement about the population, and these conclusions are based on mathematical theories. These theories require certain assumption about the population, and the conclusions are only valid if these assumptions are true.

18. Know that **bootstrapping** is a computationally intensive, nonparametric statistical method that does not require assumptions about the population.

19. Know that in bootstrapping an initial sample is drawn without replacement from the population just like in parametric statistics.

20. In bootstrapping multiple samples are drawn from the initial sample with replacement, and statistics computed on these bootstrapped samples are then used to draw conclusions about the population.

21. Know that in virtually all research a **single sample** is selected without replacement.

22. Inferential statistics is based on a **mental experiment** in which a researcher **draws all possible sample of a given size**, and calculates a sample statistic, such as the mean, on each of these samples. In many cases the sample statistic is used as an estimate of the population parameter. For example, the sample mean is used as an estimate of the population mean.

23. If the mean of the statistic for all samples is equal to the parameter being estimated, then the statistic is said to be an **unbiased** estimate of the population parameter. For example, the sample mean is an unbiased estimate of the population mean because the mean of the means calculated from all possible samples equals the mean of the population.