Midterm 1 Study Guide

This is meant to be a representative sampling of the key concepts you will need to know, and it is not meant to be exhaustive. You should make sure that you are comfortable with Quizzes 1-3 and Homework Assignments 1-6, as well as the recommended problems from the book.

1. In what way does the data we use in statistics differ from just a bunch of numbers?
2. What are the main types of variables? What distinguishes them?
3. What types of graphs do we have available? When do we use which graph? What are advantages/disadvantages of each type of graph compared to other graphs for the same variable?
4. What terms do we use to describe the distribution of a scalar variable? Demonstrate with examples.
5. What are the various measures of center? What are the advantages and disadvantages of each?
6. The IQR and the standard deviation both measure spread, but they do so in totally different ways. Explain in what way they attempt to measure "spread".
7. What happens to the shape, center and spread of a distribution of a variable when it undergoes a linear transformation?
8. How does the "suspected outlier test" work?
9. How is the (modified) boxplot drawn?
10. Suppose a distribution is skewed to the right. How will that show in the boxplot?
11. What does it mean to say that a measure is *resistant*?
12. In terms of the z-values, what are the first and third quartile for the normal distribution?
13. What percent of values in a normal distribution would be classified as outliers?
14. How do we find where the middle 40% of data lies in a normal distribution?
15. How do we go back and forth between p, z and x in a normal distribution?
16. What is the IQR of the standard normal distribution?
17. What units are the z-values measured in?
18. Describe how stratified sampling and cluster sampling work, and how they differ from simple random sampling. In what situations might we choose to use stratified sampling? What about cluster sampling?
19. What is the difference between an observational study and an experiment?