MTH 220 – Introduction to Probability & Statistics
Review Questions & Ideas for Exam 3

Terms to Define:

- standard normal random variable
- random sample
- percentile
- stratified random sample
- statistical science
- cluster sample
- ratio scale data
- systematic sample
- interval scale data
- descriptive statistics
- ordinal scale data
- parameter
- nominal scale data
- statistic
- continuous random variable

Conceptual Questions:

1. What are the two main issues for continuous random variables that we pointed out in class? [BE SPECIFIC]

2. Can you give your own examples of discrete and continuous random variables?

3. How do we compute probability associated with continuous random variables?

4. When should a uniform random variable be used? Do intervals of the same length have the same probability in this case?

5. What does the graph of the uniform density function look like? What is the height of this curve? How do you find area under this particular curve?

6. What are the expected value and standard deviation of the uniform random variable?

7. Have you reviewed the UPS pickup problem done in class?

8. What are the properties of all normal random variables? When referring to a normal random variable, what does $\mu$ control? What does $\sigma$ control?

9. Can you draw a picture of two normal random variables that have the same $\mu$, but different $\sigma$? Same $\sigma$, but different $\mu$? Different $\mu$ and different $\sigma$?

10. What is the standardization theorem and when should you use it?
11. If $Z$ is a standard normal random variable, how do you use Table N in order to find $P(Z \leq z)$? What about $P(Z \geq z)$? What about $P(z_1 \leq Z \leq z_2)$?

12. If $X \sim N(\mu, \sigma)$, how do you find $P(X \leq x)$? What about $P(X \geq x)$? What about $P(x_1 \leq X \leq x_2)$?

13. Have you reviewed all of the normal curve problems done in class? Have you reviewed all of the normal curve problems posted on the class web site?

14. How do you solve percentile problems associated with normal curve? Do you understand what we mean when we say that you must use the "table in reverse" for percentile problems?

15. What types of problems are posed in statistical studies? That is, what do we do in statistical problems?

16. In class, we mentioned that there are always two things relevant in statistical studies. What are these two issues?

17. What is the difference between quantitative data and qualitative data?

18. Can you give examples of types of data from each of the four scales discussed in class?

19. What is the best way to make sure your sample taken is representative of the population you are trying to study?

20. In our unit on descriptive statistics, what graphical methods did we study? Can you draw them if given a data set? What numerical methods did we study? Can you calculate them if given a data set? Which of these numerical methods are measure of center? Measures of spread?

21. What is an outlier and how do outliers affect the numerical measures that we studied in descriptive statistics?

22. What are the physical interpretations of the sample mean, the sample median and the sample standard deviation?

23. What is the goal of creating a histogram? What features of the data should you address when describing the histogram and/or dot plot for a data set?

24. Is it possible for two (or more) accurately drawn histograms to have used a different number of bins? Explain why or why not.

25. What do large values of $s$ indicate about your data set? What about small values of $s$?