HW #7, due Friday, November 14, 2008

Section 7.2 Questions. Do the following problems from the text: p. 259 #7.10; p. 272 #7.17,19,20,25,26,31,33, plus the questions below.

- 1. Decide whether the sampling is simple random sampling, stratified random sampling, cluster sampling, 1-in-k systematic sampling or convenience sampling in each case.
  - a. Oranges in an orchard are sampled by randomly selecting 10 of 100 trees then collecting data for all oranges on the ten selected trees.
  - b. In order to draw a sample of CSUS students, I collect data from all students in my three classes.
  - c. Every 500<sup>th</sup> CD player coming off an assembly line is selected for quality control sampling.
  - d. A sample of voters is taken by randomly selecting 100 voters from each of the 50 states in the USA.
  - e. 5 passengers on an airplane are selected to receive a free beverage by putting slips of paper with all passengers names in a hat, mixing the names and drawing 5 slips of paper.
  - f. The only kind of sampling for which the inferential methods we will learn in this class will work.
- 2. Johns Hopkins researchers conducted a study of pregnant IBM employees. Among 30 who worked with glycol ethers 10 had miscarriages, but among 750 who were not exposed to glycol ethers, 120 had miscarriages.
  - a. Calculate the proportion of miscarriages for women who worked with glycol ethers and those who did not. Does there appear to be a relationship between working with glycol ether and risk of miscarriage? (Really, we need to account for a margin of error, which we haven't learned about yet, so just compare the proportions.)
  - b. This was an observational study. Can we conclude that glycol ether increases the risk of miscarriage on the basis of this data alone? Why or why not?
  - c. What would be wrong with conducting a designed experiment to determine if glycol ether causes miscarriages?
- 3. A study is conducted to investigate the relationship between wealth and happiness. Data are collected from each subject on their annual salary and their happiness. Happiness is reported on a scale of 1 to 10 with 10 being extremely happy and 1 being extremely unhappy.
  - a. Is this an observational study or a designed experiment?
  - b. If we found a positive correlation between money and happiness, could be conclude that money causes happiness?
- 4. The poll results shown below are from the website <u>http://www.pollingreport.com/life.htm</u>. N is the sample size and MoE stands for margin of error. Is the an observational study or a designed experiment?

Gallup Poll. July 12-15, 2007. N=1,001 adults nationwide. MoE ± 3 (for all adults)

"Would you favor or oppose a federal law that would lower the drinking age in all states to 18?" N=464, MoE  $\pm$  5 (Form A)

	%	%	%
7/12-15/07	22	77	1

"Do you think the penalties for underage drinking should be made more strict, less strict, or remain as they are now?" N=537, MoE  $\pm$  5 (Form B)

			Remain As	
	More Strict	Less Strict	They Are	Unsure
	%	%	%	%
7/12-15/07	60	6	31	3

- 5. Read the ABSTRACT only for the *New England Journal of Medicine* article "Cognitive Behavioral Therapy, Sertraline, or a Combination in Childhood Anxiety." This article is posted on the course website.
  - a. Is this a designed experiment or an observational study?
  - b. If it is a designed experiment
    - i. Were subjects randomly assigned to control and treatment groups?
    - ii. Was a placebo used?
    - iii. Was the study double-blind? (see p.4 section "Randomization and Masking") If not, was any sort of blinding attempted?
- 6. The New England Journal of Medicine is a peer-reviewed journal.
  - a. What is a peer-reviewed journal? (you might "google" this or check Wikipedia).
  - b. Why is a finding from a peer-reviewed journal more trustworthy than a finding posted on John Doe's personal website?