HW 1

1) Exercises 1.19 a), b), 1.24 a), b), c), and 1.31 a), b), c), Sincich.

2) A group of college students believes that herbal tea has remarkable restorative powers. To test this belief, they make weekly visits to a local nursing home, visiting with the residents and serving them herbal tea. The nursing home staff reports that after several months most of the residents are more cheerful and healthy. A skeptical sociologist commends the students for their good deeds but scoffs at the idea that herbal tea helped the residents. It’s all confounding, says the sociologist. Identify the treatment and response variable in this informal study. Then explain what other variable is confounded with the treatment.

3) The author Shere Hite undertook a study of women’s attitudes toward love and sex by distributing 100,000 questionnaires through women’s groups. Only 4.5% of the questionnaires were returned. Based on this sample of women, Hite wrote Women and Love, a best-selling book claiming that women are fed up with men. For example, 91% of the divorced women in the sample said that they had initiated the divorce and 70% of the married women said that they had committed adultery. Explain briefly why Hite’s sampling method is nearly certain to produce a strong bias. Hint: Think about the types of errors in surveys we considered in class.

4) During World War II, many economists, mathematicians and statisticians were members of Columbia University’s Statistics Research Group, which did high level consulting work for the armed forces. As part of this group’s work, statistician Abraham Wald was asked where to place armor on planes. It seemed obvious to the aircraft engineers that armor was needed at the places most frequently hit as found in a large sample of battle proven airplanes. After studying the bullet holes of a sample of returning planes, Wald’s conclusion was to place armor where bullet holes were least frequently found in these planes. What was wrong with the engineers’ sampling design that made Wald come up with this seemingly odd conclusion? Hint: Are the engineers seeing a random sample of all planes?