Stat 2216 Spring 2012
Statistical Methods R. Claycombe

First Exam

Write all answers in your blue book and show all work there. Return your exam and printout(s) in your blue book.

15 pts.
1) Prof X wants to predict demand for product X that his company makes.
a) He systematically calls people in the local phone book.
b) Mr Y says that they should interview people at stores where the product is sold.

What does systematically mean here? Can it be applied in part b too? Think of one concern that you have about each method and explain it.

20 pts.
2) Suppose that we have a trivially small population of (2,6,10) .
a) Would it make sense to use a sample to estimate μ? Why?
b) What important concept can we easily illustrate with a trivially small set of data like this? Do it.

c) Use what you've started above to illustrate that either $\sigma_{\bar{x}} = \sigma/\sqrt{n}$ for the "infinite" population or $\sigma_{\bar{x}} = (\sigma/\sqrt{n})\left(\sqrt{(N-n)/(N-1)}\right)$ for a finite population.

30 pts.
1)

Cost	Quantity
2	1
4	3
6	5
7	9

a) Find by hand (show work) the regression equation where Cost is a function of Quantity .
b) Calculate a statistic that measures how well the data fit the line. Interpret it.
c) Calculate a statistic that measures how much Quantity effects Cost. Use it to test for the significance of the effect. (α = .01, show all steps to the test)
d) Suppose that there really is a correlation between these variables. Does it seem reasonable to say that there is causation as well as correlation? Why?

27 pts
4) **Computer Problem.** Use the Safety file in the Chapter 14 folder of the 2216 files with your choice of SPSS or Excel for a regression. Be sure to type your name into the printout.

a) Write the regression equation by hand on to the printout, where fatal accidents is a function of percent under 21.
b) What do you see that suggests a significant relationship? Use every statistic that applies.
c) Use the results to construct a 99 percent confidence interval for the mean value of fatal accidents when the percent under 21 is 30. What cause do you have to lack confidence in this interval?

8 pts.
5) Suppose that the errors of a regression are normally distributed, what is the probability that the standardized value of an error will be 2.58 or more. Give the formula for the standardized value of an error.

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has. _____