Stat 2216 Spring 2007
Statistical Methods R. Claycombe

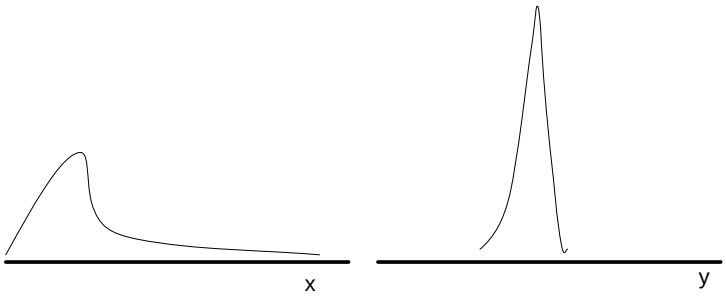
First Exam

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

20 pts.
1) a) Mr. X wants to survey his potential customers. Up till now he's used the local phone book and called every 20^{th} listing. What concern do you have about his approach? Explain.
b) Mrs. Y has a list of her customers in her appointment book. She selects all the ones who came in on Wednesday as her sample. What concern do you have about her approach? Explain.
c) To collect his data, Mr. Z sends a questionnaire to every member of his population. What concern do you have about his approach? Explain.
d) Which individual above seems least likely to need to apply the finite correction factor to his standard errors? Why?

12 pts.
2) Plan the sample size for study where you can tolerate a sampling error of $2 with a 90% level of reliability. All you have for the standard deviation are high and low values of 60 and 20 that are thought to be 4 standard deviations apart.

12 pts.
3) Consider the diagrams below.



a) Which population appears to have the largest σ ? Why?
b) If $n_x = 10000$ and $n_y = 100$, which variable appears to have the larger $\sigma_{\bar{X}}$? Why?
c) Which population is more likely to have a skewness coefficient of 1? Why?

12 pts
4) **Computer Problem.** a) Open the "Music" file in the Chapter 3 folder of the 2216 files.
b) Is there convincing evidence that the population mean time is greater than 40 minutes? Show all steps to the test, $\alpha = .05$.

20 pts.

5) Senator H thinks that the mean income in her district is 30000.

a) What should she conclude about her hypothesis at the 5% level of significance if a sample of 100 has a mean of 30500 and a standard deviation of 3000? Show all steps to the testl

b) What is the power of the test, if the real mean is 31000?

12 pts.

6) a) If the population X has only two values {1,2} and we take samples of 2 with replacement, show the sampling distribution for $\overline{X}$.

b) Find the expected value of $\overline{X}$. Show your work.

12 pts.

7) a) Find a 90% confidence interval for μ when $\overline{X}$ = 10, s = 2 and n = 25.

b) Find a 95% confidence interval for μ when $\overline{X}$ = 10, s = 2 and n = 36.

c) What assumption do you have to make in part a that you don't need in part b?

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