First Exam

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

22 pts.

1) The commissioners want a survey of the county to learn about residents' satisfaction with services and
opinions regarding methods of taxation.

a) . Commissioner A wants to send interviewers door to door in several of the towns. What advantage and
disadvantage do you see in this approach?.

b)   Commissioner B wants to draw a sample from the phone book and use telephone interviews. Describe
an efficient and reasonably random way to do this. Still, what major problem might this approach create?

c) Commissioner C wants to send every resident a survey form. Identify two problems that you see with
this approach

23 pts.

2) The NHL had a very short season. Our team only played three games, giving us trivial population of 3
scores. They scored one goal in the first game and two in the second and three in the third. Goals =
[1,2,3].

If we sample without replacement and n = 2,

a) Show the sampling distribution of $\overline{X}$ with the probabilities and use this information to find the

expected value of $\overline{X}$ and $\sigma_{\overline{x}}$.

b) Confirm the value of $\sigma_{\overline{x}}$ using appropriate equation from chapter 7.

c) Does your work in part a suggest that $\overline{X}$ is an unbiased estimator of μ? Why?

Estimator 1
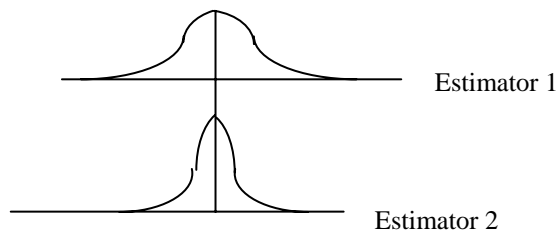
Estimator 2

d) Which of the two estimators above appears to be less efficient? Why?

22 pts

3) COMPUTER PROBLEM

a) Open "Scheer" in the chapter 8 Excel files with Excel and find a 90 percent confidence interval for the population mean for days. Clearly label it in your spreadsheet and print the results.

b) Now open Scheer with SPSS and test the null hypothesis that $\mu \leq 52$ with $\alpha = .01$. Print the results. Show all steps to the test.

15 pts

4) The commissioners will vote to reduce the parks budget for the county, if there is convincing evidence that less than 20 percent of residents think that parks are important. They have a sample of 200 where 37 say that parks are important. Is this convincing evidence at the 5% level of significance? (Show all steps to the test.)

23 pts

5) a) The mean weight of apple bags is supposed to be 5 lbs. Samples of 81 bags are taken to test this hypothesis. If $s = .1$ lb and $\alpha = .05$, what are the boundaries to the acceptance range for the test?

    b) Find B (Type II prob) when the mean is 5.02 lbs. and when the mean is 5.04 lbs.

    c) Sketch a power curve using what you found in parts a and b.

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

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