

First Exam

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

18 pts.

- 1) a) Mr. X deploys his survey teams in a half a dozen city blocks and leaves the other blocks unsurveyed. By concentrating on the 6 blocks he saves time and gets a big sample. What kind of sample is this and what major weakness might it have?
- b) Mrs. Y has designed her sample to have 4 parts, one for each of 4 occupations in her firm. She has 40 percent of the sample allocated to the first occupation. What kind of sample is this and why might so much of it be allocated to the first occupation?
- c) Mr. Z seeks teenage opinion so he gets a list of students in the area and selects every 20th person to be in sample. What kind of sample is this and say if you see any flaw in Mr. Z's approach.

20 pts.

- 2) Suppose that we have a trivially small population of (0,3,6).
 - a) Find the mean and σ .
 - b) Show the sampling distribution for $n = 2$ with replacement. Show the probabilities too.
 - c) Use the information in part b to find the standard error of the mean and confirm that is correct using the infinite population formula.
 - d) Does this exercise suggest that the sample mean is an unbiased estimator? Why?

10 pts.

- 3) The sample mean is 40 and s is 20 for a sample of 100. Find a 90 percent confidence interval for μ .

12 pts

- 4) **Computer Problem.** a) Open the Diamonds file in the Chapter 9 (hypothesis tests) folder of the 2216 files using SPSS.
 - b) Use it to test the hypothesis that $\mu = 5500$ for price variable. Let $\alpha = .01$ and show all steps to your test on your printout. (Don't print the data or anything else that wastes paper.)

20 pts.

- 5) a) If the sample mean is 50 and s is 25 for a sample of 49 is this convincing evidence that μ greater than 40 at the 5 percent level of significance? Show all steps to the test.
 - b) What is the power of the test if the real mean is 48?

10 pts

6 If $\bar{p} = .7$ is this convincing evidence that $p \neq .6$? $n = 36$ and $\alpha = .1$. Show all steps to the test.

10 pts

7) If \hat{x} is an efficient estimator, what does that mean?

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