Name: _____ TA Name: _____ Secret Word: _____

Data 88S

April 17, 2024

Chapter 9, Exercise 2

1. A survey organization studying households in a county takes a simple random sample of 500 households from all the households in the county.

   - The size of a household is the number of people who live in it. The sizes of the sampled households have an average of 2.8 and an SD of 2.1.
   - Ten percent of the sampled households consist of just one person. Such households are called "single person" households.

   (a) If possible, construct an approximate 90% confidence interval for the average household size in the county. If this is not possible, explain why.

   (b) True or false: About 68% of the households in the sample had between 0.7 and 4.9 people.

   (c) If possible, construct an approximate 90% confidence interval for the percent of single person households in the county. If this is not possible, explain why not.

Chapter 9, Exercise 5

2. All the patients at a doctor's office come in annually for a check-up when they are not ill. The temperatures of the patients at these check-ups are independent and identically distributed with unknown mean μ

   The temperatures recorded in 100 check-ups have an average of 98.2 degrees and an SD of 1.5 degrees. Do these data support the hypothesis that the unknown mean μ is 98.6 degrees, commonly known as "normal" body temperature? Or do they indicate that μ is less than 98.6 degrees?

   Make a decision in the following steps.

   (a) State an appropriate null hypothesis in informal terms and also in terms of random variables.

   (b) State an appropriate alternative hypothesis.

   (c) What test statistic do you want to use? Justify your choice.

   (d) Find the p-value of the test, exactly if possible or approximately if it is not possible to get an exact answer.

   (e) At the 5% level, what is the conclusion of the test? Why?

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3. Rosen and Jerdee conducted several experiments using male bank supervisors (this was in 1974) who were given a personnel file and asked to decide whether to promote or hold the file. 24 were randomly assigned to a file labeled as that of a male employee and 24 to a female.

   21 of the 24 males were promoted, and 14 of the females. Is there evidence of gender bias?

Chapter 9, Exercise 8

4. The p-value of a test of hypotheses is 0.001.

   Say whether each of the following statements is true or false, and explain.

   (a) There is only about a 0.001 chance that the null hypothesis is true.

   (b) There is about a 0.999 chance that the alternative hypothesis is true.