

Math 1600, Section 7, Fall 2012 – Statistics
Review Chapters 8.5, 9, 10, 3.5

Section 8.5

1. A random sample of 2000 people from the labor force or a large city are interviewed, and 175 of them are found to be unemployed.
 - a. Estimate the rate of unemployment based on the data.
 - b. Establish a 98% error margin for your estimate.
2. While estimating a population proportion using a large sample, it is reported that the point estimate of p is $\hat{P} = .32$ and its 90% error margin is .08. Using this information find:
 - a. A 95% confidence interval for p ,
 - b. The sample size n that was used in the study.
3. From telephone interviews with 980 adults, it was found that 78% of those persons supported tougher legislation for antipollution measures. Does this poll substantiate the conjecture that more than 75% of the adult population is in favor of tougher legislation for antipollution measures? (Note that you cannot use the results of the survey until step d.)
 - a. Formulate the hypotheses.
 - b. State the test statistic and the form of the rejection region.
 - c. With $\alpha = .03$ determine the rejection region.
 - d. Calculate the test statistic from the data.
 - e. Draw your conclusion (this should include a computation of the P-value). Write the final conclusion as a sentence that answers the question in the problem statement.

Chapter 9

True or False:

1. Confidence intervals based on the t -distribution are wider than those based on the standard normal distribution. T or F
2. A hypothesis test for a sample mean with small samples and sample size of n has $n/2$ degrees of freedom. T or F
3. The t -distribution has less variability than the standard normal distribution. T or F

Short Answer:

4. The quantity $T = \frac{\bar{X} - \mu}{S/\sqrt{n}}$ has _____ degrees of freedom.
5. The t -distribution is symmetric about _____.
6. The upper .01 point of the t -distribution with 14 d.f. is _____.
7. The lower .05 point of the t -distribution with 7 d.f. is _____.
8. The 97.5th percentile of the t -distribution with 23 d.f. is _____.
9. For the t -distribution with 11 d.f. the probability $T > 2.9$ is between _____ and _____.

Computations:

10. Given the following, compute a 95% confidence interval for the population mean, μ .

$$n = 17, \sum x_i = 220, \sum (x_i - \bar{x})^2 = 75$$

11. A manager wants to estimate the time it takes to process an order. A random sample of 6 recent orders yields the following times:

28 26 25 30 22 34

Determine a 90% confidence interval for the true time to fill orders. State any assumptions you make.

Sections 9.4 and 9.5

True or False:

1. The χ^2 distribution is an example of a symmetric distribution. T or F
2. Inferences on a population standard deviation are based on the t -distribution. T or F
3. If a 95% confidence interval contains a particular value, μ_0 , then the two sided hypothesis test with a null hypothesis using μ_0 with $\alpha = .05$ would lead to a rejection of the null hypothesis. T or F

Short Answer:

4. The upper 5% of the χ^2 distribution with 8 degrees of freedom is _____.
5. 30.19 is the upper _____% of the χ^2 with 17 degrees of freedom.
6. The lower 5% of the χ^2 distribution with 22 degrees of freedom is _____.
(For 7 and 8.) Suppose that from a random sample a 90% confidence interval for the population mean has been found to be (12.8, 14.3).
7. Would $H_0 : \mu = 15$ be rejected in favor of $H_1 : \mu \neq 15$ at $\alpha = .10$?
 - a) yes
 - b) no
 - c) cannot tell
8. Would $H_0 : \mu = 13$ be rejected in favor of $H_1 : \mu \neq 13$ at $\alpha = .10$?
 - a) yes
 - b) no
 - c) cannot tell

Computations:

9. For data from a set of $n=10$ observations, one has calculated the 95% confidence interval for σ and obtained the result (4.05, 10.75).
 - a. What was the standard deviation s for the sample? (Hint: Examine how s enters the formula of a confidence interval.)
 - b. Calculate a 90% confidence interval for σ .

Chapter 10

True or False:

1. In matched pairs sampling, complete randomization is used. T or F
2. An inference with two independent random samples in the case of large samples does not require the population variances be the same. T or F
3. To construct a large sample confidence interval for $\mu_1 - \mu_2$ we must assume the data is normally distributed. T or F

Short Answer:

4. The basic unit or object that receives one of the treatments is called the _____.
5. _____ prevents uncontrolled sources of variation from influencing the responses in a systematic manner.
6. When sample sizes are small we assume both populations are _____ for the independent two sample test.

Computations:

7. Do problem 10.12 on page 405 of our book.
8. Do problem 10.13 on page 405 of our book.

Lab 18 – see that handout

Chapter 3 – recommended homework