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| **Assignment 2: Mixed Problems**   1. In your own words explain the difference between a point estimate and an interval estimate of a parameter? Which is better? Why?   Answer: The point estimate is the value that is specific and is a single number of a parameter and the interval estimate of a parameter is a range of values that may or may not contain the value of the parameter estimated, the interval of estimate is better because it covers a range of values and not just a single value.   1. What information is necessary to calculate a confidence interval? Is the size of the population relevant when one is determining the sample size for a confidence interval? What is necessary to determine the sample size?   Answer: to calculate the a confidence of interval we need the following information:   * + - Description of the population     - The sample size     - The levels of confidence 1 - ∞     - Determine the confident coefficient     - State the confidence interval.   Yes, the sample size of the population is important because it will determine the size of the sample size and the size of the parameter being estimated. To determine the sample size is necessary to know the data in the sample   1. Choose a variable (such as number of daily admissions at a local theater or number of miles students have to commute daily to get to their college). Before collecting the data, decide what a likely average might be, then complete the following:    * + Lets choose a variable of daily admissions at a local. The average number of admissions at a local theater is 100 admissions.    1. Write a brief statement of purpose of the study   The purpose of the study is to know approximately how many people attend this theater a week.   * 1. Define the population   Answer: We first identify the populations parameter in the question, in this case the parameter is the “ average number of admissions at a local theater”, The null hypothesis states that the parameter has a specific value, and in this case the value is 100 admissions so the formula for this would be:  H0: µ= 100, in this case we are looking at this case and our alternative hypothesis would be Ha : µ ≠100   * 1. State the hypotheses for the study.   The hypothesis of the study is that we are stating that the average admissions for a local theater is 100 and in our alternative hypothesis we are contending that the average number of admissions to this theater is not equal to 100   * 1. Select an a value = 400   2. State how the sample was selected   The sample was selected by choosing random numbers.   * 1. Show the raw data   X bar= 200  µ = 400 population mean  סּ= 5 standard deviation.  n = 300 sample size   * 1. Compute the test statistic   Z = x bar - µ/ סּ/ n =  Z = 200 – 400 / 5 / 300  Z = - 2.3   * 1. Find the critical values(s)   Answer:   * 1. State the decision   2. Summarize the results   You may obtain raw data from the random number table in the appendix section of your text or from any other sources on the World Wide Web.   1. A sample of the math test scores of 35 fourth-graders has a mean of 82 with a standard deviation of 15.    1. Find the 95% confidence interval of the mean math test scores of all fourth-graders.   Answer: x bar = 82  סּ= 1  n = 35  0.025 0.025  95%  z = -1.96 z = 1.96  E = Z ∞/ z / סּ/ n = 1.96 = 15/ 35≈ 4.97  X bar –E < x bar < x bar + E + 82 – 4.97 < x bar < 82 + 4.97= 77.03 < xbar < 86.97   * 1. Find the 99% confidence interval of the mean math test scores of all fourth-graders.   Answer:  0.005 0.005  99%  Z = - 2.575 z = 2.575  E -= Z ∞/z סּ/ n = 2.75 15/ 35 = 6.53  82 – 6.53 < xbar < 82 + 6.53 75.47 < x bar < 88.53   * 1. Which interval is larger? Explain why.   Answer: 99% confidence interval is larger because it covers a wider range of the sample being tested.   1. A researcher is interested in estimating the average salary of fire fighters in a large city. He wants to be 95% confident that his estimate is correct. If the standard deviation is $1,050סּ, how large a sample is needed to get the desired information and to be accurate within $200?   Answer: n = Zc סּ/E ^2 = (1.96 ( 1050) ) / 200 10.88 = 106     1. A researcher claims that the average age of people who buy lottery tickets is 70. A sample of 30 is selected and their ages are recorded as shown below. The standard deviation is 16. At alpha = 0.05, is there enough evidence to reject the researcher’s claim?   49 63 90 52 22 80 72 56 82 56  24 46 70 74 70 61 65 71 39 74  79 76 71 49 62 68 71 67 69 45  Answer: H0 = M = 70 claim  Ha = M ≠ 70  X = 0.05  X = 62.4 סּ= 16  n= 30 (big)  Reject Ho H0 accept  0.05  Z = - 1.645  Z = xbar – M/ סּ/ n = 62.4- 70/ 16 / 30 = - 7.6/ 2.42 = - 2.60  Reject Ho ( the claim) and yes, there is enough evidence because the mean does not equal 70.     1. A sample size of 35 is used to test *H*0: m 65 vs. *H*a: < 65. Given that = 63.5 and = 2.5, answer the following questions    1. What is the computed value of the test statistic?   Answer: Ho ≥ 65, Ha < 65  X bar = 63.5 , סּ = 2.5 , n = 35  Z= x bar – M / סּ/ n = 63.5 – 65 / 2. / 1.35 = - 1.5/0.423 = - 3.55   * 1. What distribution does the test statistic have when the null hypothesis is true?   Answer: null hypothesis is Ho thus normal Z distribution   * 1. Is the alternative hypothesis one-tailed or two-tailed?   Answer: 1 tailed.   * 1. What is the p-value?   Answer: Z =0   1. List the steps involved in hypothesis testing using: a) the traditional/classical method, b) the probability-value method. Provide an example of each. 3. **Identify the claim to be tested** 4. **Give the symbolic for m that must be true when the original claim is false.** 5. **Null hypothesis ( Ho) the parameters equals the fixed value and the alternative hypothesis (Ha)uses**   **>, < or ≠**  **4. Elect the significance level ∞**  **5. Identify the test statistic.**  **6. Find the critical values and critical regions by drawing a graph**  **7. Reject Ho if test statistic is in the critical region and accept Ho if it is not in the critical region**  **8. Retest the decision and address original claim.**  **b) 1. Identify claim**  **2. Find the p value by graphing**  **3. Reject Ho if p- value ≤∞**  **4. Accept Ho if p-value > ∞**  **Retest the decision and address original claim.** |  |  |

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