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SIE 330R Homework, Spring 2023
Homework 2 (Chapter 2)
Homework must be readable! Do not just send in numbers or charts. You must explain the homework answers Preferred to receive homework in Word doc format with any excel or Minitab results pasted into word document. You may choose to use pdf which is also OK.
Put answers to all questions in one document NOT in separate documents

1. Which of the following is a valid Null Hypothesis?

   (a) Ho: μ=10

   (b) Ho: μ>5.34

   (c) Ho: $\bar{x}$= 45.7

   (d) Ho: $\sigma \leq 3.5$

   (e) Ho: p>0.7

   (f) Ho: n=10

   A valid null hypothesis is option A, Ho: μ=10. This is becasue option A is the only null hypothesis that includes a mean equal to, greater than or equal to, or less than or equal to a value.

2. A school district believes that the average score for a particular math class is 85. The null and alternative hypotheses being tested are:

   Ho: $\mu \geq 85$

   H1: $\mu < 85$

   In plain English describe the outcome of a Type I Error

   A Type I error occurs when the null hypothesis is ture and rejected.

   In plain English describe the outcome of a Type II Error

   A Type II error occurs when the null hypothesis is false and not rejected.

   In plain English describe a correct decision

   A correct decision occurs when the null hypothesis is ture and not rejected, and when it is false and rejected.

3. A particular snack brand is advertised that each package contains 454 grams. It is suspected that the packaging machine is off and on the average each package contains less. A large sample is taken in order to test the hypotheses:

   Ho: $\mu \geq 454$

   Ha: $\mu < 454$

   The P-value is calculated as 0.09.

   Which of the following would be a correct interpretation of the P-value?

   (a) It can conclusively be stated that the packaging machine is working correctly

   (b) There is a 9% probability that the exact fill weight average is 454 g.

   (c) The probability of obtaining a sample mean as extreme as the one observed given that the true mean is exactly 454 g is 0.09, or 9%.

   (d) There is a 9% probability that the alternative hypothesis is true, that the mean fill rate is less than 454 g.

   (e) 9% of the sample was less than 454 g.

Because the P-value is greater than 5%, the correct interpretation of the calculated P-value would be to reject the null hypothesis, i.e., option D: there is a 9% probability that the alternative hypothesis is true, that the mean fill rate is less than 454 g..

4. The Bureau of Labor Statistics would like an estimate of the average age of workers in a particular field. 50 people are sampled and their ages are recorded. The 95% Confidence Interval is calculated as being {33.0, 39.8}
   What is the correct interpretation of this Confidence Interval?

   (a) The true average age of workers will fall between 33.0 and 39.8

   (b) 95% of all people in this field are between 33 and 39.8 years old.

   (c) If 100 samples are taken of this population using this same method and then the Confidence Interval of each are calculated, about 95 of the intervals will contain the true population mean value.

   (d) There is a 95% probability that the true average is between 33 and 39.8

   Because the 95% CI is the probability of the mean falling between the given interval, 33.0 and 39.8, the correct interpretation for this CI is option C, if 100 samples are taken of this population using this same method and then the Confidence Interval of each are calculated, about 95 of the intervals will contain the true population mean value.