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ASSIGNMENT ANSWERS

1. What do you understand by hypothesis testing?

- Hypothesis testing is an act in statistics whereby an analyst tests an assumption regarding a population parameter. The methodology employed by the analyst depends on the nature of the data used and the reason for the analysis.

- Hypothesis testing is used to assess the plausibility of a hypothesis by using sample data. Such data may come from a larger population, or from a data-generating process. The word "population" will be used for both of these cases in the following descriptions.In hypothesis testing, an analyst tests a statistical sample, with the goal of providing evidence on the plausibility of the null hypothesis.

- Statistical analysts test a hypothesis by measuring and examining a random sample of the population being analyzed. All analysts use a random population sample to test two different hypotheses: the null hypothesis and the alternative hypothesis.

- The null hypothesis is usually a hypothesis of equality between population parameters; e.g., a null hypothesis may state that the population mean return is equal to zero. The alternative hypothesis is effectively the opposite of a null hypothesis; e.g., the population mean return is not equal to zero. Thus, they are mutually exclusive, and only one can be true. However, one of the two hypotheses will always be true.

- Four Steps of Hypothesis Testing

  All hypotheses are tested using a four-step process:

  - The first step is for the analyst to state the two hypotheses so that only one can be right.
  - The next step is to formulate an analysis plan, which outlines how the data will be evaluated.
  - The third step is to carry out the plan and physically analyze the sample data.
  - The fourth and final step is to analyze the results and either reject the null hypothesis, or state that the null hypothesis is plausible, given the data.

2.Difference between the classical and the p-value approach

CLASSICAL APPROACH	P-VALUE APPROACH
select a test statistic.	select and compute the test statistic.
select a significance level, or a specific probability level, which if exceeded, signals that the test statistic is large enough to consider significant.	refer the test statistic to its appropriate reference distribution.
delineate the "rejection region" under the pdf of the appropriate distribution for the test statistic, (i.e. determine the specific value of the test statistic that if exceeded would be grounds to consider it significant.	calculate the probability that a value of the test statistic as large as that observed would occur by chance if the null hypothesis were true (this probability, or p-value, is called the significance level).
compute the test statistic	if the significance level is small, the tested hypothesis (Ho) is discredited, and we assert that a "significant result" or "significant difference" has been observed.

3. What is the importance of hypothesis testing in research??

They provide a logical framework for hypothesis testing in biology

They provide an accepted convention for statistical analysis

The techniques are tried and tested

The alternative hypothesis can be rather vague

They reflect the same underlying statistical reasoning as confidence intervals