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ANSWERS:

**Question 1:**

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.
* The test provides evidence concerning the plausibility of the hypothesis, given the data.
* Statistical analysts test a hypothesis by measuring and examining a random sample of the population being analyzed

**Question 2:**

Differences between the Classical and p-value approach of hypothesis testing:

**Classical approach:**

* The first **approach** of **hypothesis testing** is a **classical test** statistic **approach**, which computes a **test** statistic from the empirical data and then makes a comparison with the critical value. If the **test** statistic in this **classical approach** is larger than the critical value, then the null **hypothesis** is rejected.
* Involves the test of a null hypothesis against an alternative hypothesis
* The steps in the classical approach:

1. define or state the null and alternative hypotheses.
2. select a test statistic.
3. select a significance level, or a specific probability level, which if exceeded, signals that the test statistic is large enough to consider significant.
4. 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.
5. compute the test statistic.
6. depending on the particular value of the test statistics either a) reject the null hypothesis (Ho) and accept the alternative hypothesis (Ha), or b) fail to reject the null hypothesis.

**P-Value approach:**

* The P-value approach involves determining "likely" or "unlikely" by determining the probability — assuming the null hypothesis were true — of observing a more extreme test statistic in the direction of the alternative hypothesis than the one observed. If the P-value is small, say less than (or equal to) α, then it is "unlikely." And, if the P-value is large, say more than α, then it is "likely."
* If the P-value is less than (or equal to) α, then the null hypothesis is rejected in favor of the alternative hypothesis. And, if the P-value is greater than α, then the null hypothesis is not rejected.

The steps in the "p-value" approach are:

1. define or state the null and alternative hypotheses.
2. select and compute the test statistic.
3. refer the test statistic to its appropriate reference distribution.
4. 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).
5. 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.

**Question 3:**

According to the San Jose State University Statistics Department, hypothesis testing is one of the most important concepts in statistics because it is how you decide if something really happened, or if certain treatments have positive effects, or if groups differ from each other or if one variable predicts another. In short, you want to proof if your data is statistically significant and unlikely to have occurred by chance alone. In essence then, a hypothesis test is a test of significance. The **purpose** of hypothesis testing is to assist administrators, clinicians and researchers in making wise decisions which usually depends on the statistical decision.