STATISTICS WORKSHEET-8

Q1 to Q12 have only one correct answer. Choose the correct option to answer your question.

1. In hypothesis testing, type II error is represented by β and the power of the test is 1−β then β is:
a. The probability of rejecting H_0 when H_1 is true
b. The probability of failing to reject H_0 when H_1 is true
c. The probability of failing to reject H_1 when H_0 is true
d. The probability of rejecting H_0 when H_1 is true

Answer
b) The probability of failing to reject H_0 when H_1 is true

2. In hypothesis testing, the hypothesis which is tentatively assumed to be true is called the
a. correct hypothesis
b. null hypothesis
c. alternative hypothesis
d. level of significance

Answer
b. null hypothesis

3. When the null hypothesis has been true, but the sample information has resulted in the rejection of the null, a _____has been made
a. level of significance
b. Type II error
c. critical value
d. Type I error

Answer
d. Type I error

4.For finding the p-value when the population standard deviation is unknown, if it is reasonable to assume that the population is normal, we use
a. the z distribution
b. the t distribution with n - 1 degrees of freedom
c. the t distribution with n + 1 degrees of freedom
d. none of the above

Answer
b) the t distribution with n - 1 degrees of freedom

5. A Type II error is the error of
a. accepting Ho when it is false
b. accepting Ho when it is true
c. rejecting Ho when it is false
d. rejecting Ho when it is true

Answer
d. rejecting Ho when it is true

6. A hypothesis test in which rejection of the null hypothesis occurs for values of the point estimator in either tail of the sampling distribution is called
a. the null hypothesis
b. the alternative hypothesis
c. a one-tailed test
d. a two-tailed test

Answer

d)a two-tailed test

7. In hypothesis testing, the level of significance is
a.
b. the probability of committing a Type I error
c. the probability of either a Type I or Type II, depending on the hypothesis to be tested
d. none of the above

Answer
b)the probability of committing a Type I error

8. In hypothesis testing, b is
a. the probability of committing a Type II error
b. the probability of committing a Type I error
c. the probability of either a Type I or Type II, depending on the hypothesis to be test
d. none of the above

Answer
a.the probability of committing a Type II error

9. When testing the following hypotheses at an α level of significance
H_0: p = 0.7
H_1: p > 0.7
The null hypothesis will be rejected if the test statistic Z is
a. $z > z_\alpha$
b. $z < z_\alpha$
c. z < -z
d. none of the above
Answer

a.$z > z_\alpha$

10. Which of the following does not need to be known in order to compute the P-value?
a. knowledge of whether the test is one-tailed or two-tail
b. the value of the test statistic
c. the level of significance
d. All of the above are needed

Answer
c.the level of significance

11. The maximum probability of a Type I error that the decision maker will tolerate is called the
a. level of significance
b. critical value
c. decision value
d. probability value

Answer

a.level of significance

12. For t distribution, increasing the sample size, the effect will be on
a. Degrees of Freedom
b. The t-ratio
c. Standard Error of the Means
d. All of the Above

Answer
d.All of the Above

Q13 to Q15 are subjective answers type questions. Answers them in their own words briefly.

13. What is Anova in SPSS?

Answer

ANOVA in SPSS, is used for examining the differences in the mean values of the dependent variable associated with the effect of the controlled independent variables, after taking into account the influence of the uncontrolled independent variables. Essentially, ANOVA in SPSS is used as the test of means for two or more populations.
ANOVA in SPSS must have a dependent variable which should be metric (measured using an interval or ratio scale). ANOVA in SPSS must also have one or more independent variables, which should be categorical in nature. In ANOVA in SPSS, categorical independent variables are called factors. A particular combination of factor levels, or categories, is called a treatment.

14. What are the assumptions of Anova?

Answer

The assumptions of the ANOVA test are the same as the general assumptions for any parametric test

1. An ANOVA can only be conducted if there is **no relationship between the subjects** in each sample. This means that subjects in the first group cannot also be in the second group (e.g. independent samples/between-groups).
2. The different groups/levels must have **equal sample sizes**.
3. An ANOVA can only be conducted if the dependent variable is **normally distributed**, so that the middle scores are most frequent and extreme scores are least frequent.
4. Population variances must be equal (i.e. homoscedastic). **Homogeneity of variance** means that the deviation of scores (measured by the range or standard deviation for example) is similar between populations.

15. What is the difference between one way Enova and two way Anova?

Answer.

An **ANOVA**, short for "Analysis of Variance", is used to determine whether or not there is a statistically significant difference between the means of three or more independent groups.

1. One Way Anova studies the impact of a single factor on a particular response variable. Two Way Anova studies the impact of the interaction of two factors on an unknown response variable.
2. Continuous dependence is the essential element of one-way Anova. The dependence of multiple factors is the main point of contention for this type of methodology.
3. The number of hypothesis tests cannot be determined. At least three hypothesis tests are included in the two-way anova.
4. One dependent variable is included in One Way Anova. A combination of dependent variables is included in Two Way Anova.
5. It uses different tests on a single variable for a wider range. It tests all the variables using the same test in order to achieve accuracy in results.

One Way Anova is a statistical technique that works on the concept of continuous dependence. Even though a single variable is used, all the aspects that can be affected by it are correlated for preparing the final hypothesis. The former establishes that the means are equal and no difference exists between the groups while the latter helps establish the least probable difference between them. One Way Anova is mostly used to study population by making use of variance on three equal terms. A dependent factor and an independent factor help in satisfying any two principles of experiment design.

Two Way Anova implies the concurrent study of two unrelated factors for ascertaining the individual impact on the dependent variable. Only two factors are used in this method but the dependence is based on multiple related factors. Two Way Anova needs to satisfy a minimum of three principles as per the experiment design. Independent sampling is one of the most essential aspects of this statistical analysis. It is also known as a hypothesis-based test. The subdivision of dependent variables helps the researcher in drawing out a clear conclusion. On the other hand, the independent variables are never assumed to be constant in any case.