

STATISTICS WORKSHEET-1

1. In hypothesis testing, type II error is represented by β and the power of the test is $1-\beta$ then β is:

Ans- 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

Ans- 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

Ans- 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

Ans- b. the t distribution with $n - 1$ degrees of freedom

5. A Type II error is the error of

Ans- a. accepting H_0 when it is false

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

Ans- d. a two-tailed test

7. In hypothesis testing, the level of significance is

Ans- b. the probability of committing a Type I error

8. In hypothesis testing, β is

Ans- 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

Ans- a. $z > z_\alpha$

10. Which of the following does not need to be known in order to compute the P-value?

Ans- c. the level of significance

11. The maximum probability of a Type I error that the decision maker will tolerate is called

Ans- a. level of significance

12. For t distribution, increasing the sample size, the effect will be on

Ans- d. All of the Above

13. What is Anova in SPSS?

Ans- ANOVA i.e. "analysis of variance" in SPSS is a statistical technique for testing if 3(+) population means are all equal.

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.

There are two types of Anova:

- 1. One Way Anova:** The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of two or more independent (unrelated) groups
- 2. Two Way Anova:** The two-way ANOVA compares the mean differences between groups that have been split on two independent variables (called factors). The primary purpose of a two-way ANOVA is to understand if there is an interaction between the two independent variables on the dependent variable.

14. What are the assumptions of Anova?

Ans- For ANOVA to give you a valid result, it is required that your data "passes" these three assumptions:

- 1. Normality – The responses for each factor level have a normal population distribution.**
- 2. Equal variances (Homogeneity of Variance) – These distributions have the same variance.**
- 3. Independence – The data are independent.**

A general rule of thumb for equal variances is to compare the smallest and largest sample standard deviations. This is much like the rule of thumb for equal variances for the test for independent means. If the ratio of these two sample standard deviations falls within 0.5 to 2, then it may be that the assumption is not violated.

Along with the above assumptions, few other necessities of ANOVA are:

- Your dependent variable should be measured at the interval or ratio level (i.e., they are continuous).**
- Your independent variable should consist of two or more categorical, independent groups.**
- There should be no significant outliers**

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

Ans-

- **Meaning:**
One way ANOVA is a hypothesis test, used to test the equality of three or more population means simultaneously using variance.
Two way ANOVA is a statistical technique wherein, the interaction between factors, influencing variable can be studied.
- **Independent Variable**
One way ANOVA has One independent variable
Two way ANOVA has Two independent variables
- **Compares**
One way ANOVA compares three or more levels of one factor.
Two way ANOVA compares effect of multiple level of two factors.
- **Number of Observation**
In One way ANOVA number of observations need not to be same in each group.
In Two way ANOVA number of observations need to be equal in each group.
- **Design of experiments**
One way ANOVA need to satisfy only two principles.
Two way ANOVA needs to be satisfy all three principles.