

WORKSHEET _SET_1
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 $1-\beta$ 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

ANS: C

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

ANS: B

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

ANS: D

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

ANS: B

5. A Type II error is the error of

- a. accepting H_0 when it is false
- b. accepting H_0 when it is true
- c. rejecting H_0 when it is false
- d. rejecting H_0 when it is true

ANS: C

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
- WORKSHEET

ANS: D

7. In hypothesis testing, the level of significance 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 tested
 - d. none of the above

ANS: B

8. In hypothesis testing, α 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

ANS: A

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

ANS: C

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

ANS:

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

ANS: A

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

ANS: C

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

13. What is Anova in SPSS?

Ans: Analysis of Variance, i.e. 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.

The first step is to identify the dependent and independent variables. The dependent variable is generally denoted by Y and the independent variable is denoted by X. X is a categorical variable having c categories. The sample size in each category of X is generally denoted as n, and the total sample size $N = nc$.

The next step in ANOVA in SPSS is to examine the differences among means. This involves decomposition of the total variation observed in the dependent variable. This variation in ANOVA in SPSS is measured by the sums of the squares of the mean.

14. What are the assumptions of Anova?

Ans:

There are three primary assumptions in ANOVA:

1. The responses for each factor level have a **normal population distribution**.
2. These distributions have the **same variance**.
3. 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.

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

Ans: The only difference between one-way and two-way ANOVA is the number of independent variables. A one-way ANOVA has one independent variable, while a two-way ANOVA has two.

- **One-way ANOVA:** Testing the relationship between shoe brand (Nike, Adidas, Saucony, Hoka) and race finish times in a marathon.
 - **Two-way ANOVA:** Testing the relationship between shoe brand (Nike, Adidas, Saucony, Hoka), runner age group (junior, senior, master's), and race finishing times in a marathon.
-