

**Name of the Assignment:** Statistics (Worksheet - 8)

**Submitted by** : Shalini Joshi

**Designation** : Data Science Intern

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**Q1 to Q12 have only one correct answer.**

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

**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

- a. level of significance  
b. Type II error  
c. critical value  
d. Type I error

**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

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

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: a. accepting  $H_0$  when it is**

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

**Ans: d. a two-tailed test**

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. the probability of committing a Type I error**

8. In hypothesis testing,  $\beta$  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. the probability of committing a Type II error**

9. When testing the following hypotheses at an  $\alpha$  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: 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

**Ans: 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

**Ans: 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

**Ans: 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?

**Ans:** An ANOVA test is a way to find out if survey or experiment results are significant. In other words, they help you to figure out if you need to reject the null hypothesis or accept the alternate hypothesis.

Basically, you're testing groups to see if there's a difference between them.

Examples of when you might want to test different groups:

- A group of psychiatric patients are trying three different therapies: counseling, medication and biofeedback. You want to see if one therapy is better than the others.
- Students from different colleges take the same exam. You want to see if one college outperforms the other.

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.

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.

\*\*\*\*\*The End\*\*\*\*\*