

STATISTICS WORKSHEET-10

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

1. Rejection of the null hypothesis is a conclusive proof that the alternative hypothesis is

- a. True
- b. False
- c. Neither

Ans:-(B)

2. Parametric test, unlike the non-parametric tests, make certain assumptions about

- a. The population size
- b. The underlying distribution
- c. The sample size

Ans:-(B)

3. The level of significance can be viewed as the amount of risk that an analyst will accept when making a decision

- a. True
- b. False

Ans:-(A)

4. By taking a level of significance of 5% it is the same as saying

- a. We are 5% confident the results have not occurred by chance
- b. We are 95% confident that the results have not occurred by chance
- c. We are 95% confident that the results have occurred by chance

Ans:-(A)

5. One or two tail test will determine

- a. If the two extreme values (min or max) of the sample need to be rejected
- b. If the hypothesis has one or possible two conclusions
- c. If the region of rejection is located in one or two tails of the distribution

Ans:-(C)

6. Two types of errors associated with hypothesis testing are Type I and Type II. Type II error is committed when

- a. We reject the null hypothesis whilst the alternative hypothesis is true
- b. We reject a null hypothesis when it is true
- c. We accept a null hypothesis when it is not true

Ans:-(A)

7. A randomly selected sample of 1,000 college students was asked whether they had ever used the drug Ecstasy. Sixteen percent (16% or 0.16) of the 1,000 students surveyed said they had. Which one of the following statements about the number 0.16 is correct?

- a. It is a sample proportion.
- b. It is a population proportion.
- c. It is a margin of error.
- d. It is a randomly chosen number.

Ans:-(A)

8. In a random sample of 1000 students, $\hat{p} = 0.80$ (or 80%) were in favour of longer hours at the school library. The standard error of \hat{p} (the sample proportion) is

- a. .013
- b. .160
- c. .640
- d. .800

Ans:-(A)

9. For a random sample of 9 women, the average resting pulse rate is $\bar{x} = 76$ beats per minute, and the sample standard deviation is $s = 5$. The standard error of the sample mean is

- a. 0.557
- b. 0.745
- c. 1.667
- d. 2.778

Ans:-(C)

10. Assume the cholesterol levels in a certain population have mean $\mu = 200$ and standard deviation $\sigma = 24$. The cholesterol levels for a random sample of $n = 9$ individuals are measured and the sample mean \bar{x} is determined. What is the z-score for a sample mean $\bar{x} = 180$?

- a. -3.75
- b. -2.50
- c. -0.83
- d. 2.50

Ans:-(B)

11. In a past General Social Survey, a random sample of men and women answered the question "Are you a member of any sports clubs?" Based on the sample data, 95% confidence intervals for the population proportion who would answer "yes" are .13 to .19 for women and .247 to .33 for men. Based on these results, you can reasonably conclude that

- a. At least 25% of American men and American women belong to sports clubs.
- b. At least 16% of American women belong to sports clubs.
- c. There is a difference between the proportions of American men and American women who belong to sports clubs.
- d. There is no conclusive evidence of a gender difference in the proportion belonging to sports clubs.

Ans:-(D)

12. Suppose a 95% confidence interval for the proportion of Americans who exercise regularly is 0.29 to 0.37. Which one of the following statements is FALSE?

- a. It is reasonable to say that more than 25% of Americans exercise regularly.
- b. It is reasonable to say that more than 40% of Americans exercise regularly.
- c. The hypothesis that 33% of Americans exercise regularly cannot be rejected.
- d. It is reasonable to say that fewer than 40% of Americans exercise regularly.

Ans:-(B)

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

13. How do you find the test statistic for two samples?

Ans:- The test statistic for two samples, we need to follow these steps:

1. First, we need to determine the appropriate test statistic for the type of data we have and the research question we are trying to answer. For example, if we are comparing means of two independent samples, we might use the t-test, while if we are comparing proportions of two independent samples, we might use the z-test.
2. Next, we need to calculate the relevant sample statistics for each sample, such as the sample mean, sample proportion, or sample standard deviation.
3. We can then use these sample statistics to calculate the test statistic. This involves subtracting the null hypothesis value (such as zero or the hypothesized difference between the population means) from the difference between the sample statistics, and then dividing by the standard error of the difference.

4. Finally, we can compare the calculated test statistic to the critical value from the appropriate distribution (such as the t-distribution or the standard normal distribution) to determine whether to reject or fail to reject the null hypothesis.

14. How do you find the sample mean difference?

Ans:- The sample mean difference between two samples, you subtract the mean of one sample from the mean of the other sample.

If you have two samples, Sample 1 with n_1 observations and Sample 2 with n_2 observations, then the sample mean difference is given by:

sample mean difference = $\bar{x}_1 - \bar{x}_2$

where \bar{x}_1 is the sample mean of Sample 1 and \bar{x}_2 is the sample mean of Sample 2.

15. What is a two sample t test example?

Ans:- A two-sample t-test is used to compare the means of two independent groups to determine whether there is a significant difference between them.

Here is an example scenario: A researcher wants to determine whether there is a difference in the mean test scores between two different schools. The researcher takes a random sample of students from each school and computes the sample mean test score for each group. The null hypothesis is that the mean test scores for the two schools are the same, while the alternative hypothesis is that they are different. The researcher can then conduct a two-sample t-test to determine whether there is a statistically significant difference in the mean test scores between the two schools. The results of the test can then be used to draw conclusions about whether there is evidence to support the alternative hypothesis.