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

a. True

b. False

c. Neither

Ans – C

1. 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

1. 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

1. 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 – B

1. 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

1. 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 – B

1. 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

1. In a random sample of 1000 students, pˆ = 0.80 (or 80%) were in favour of longer hours at the school library. The standard error of pˆ (the sample proportion) is

a. .013

b. .160

c. .640

d. .800

Ans – B

1. For a random sample of 9 women, the average resting pulse rate is 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 – B

1. Assume the cholesterol levels in a certain population have mean µ= 200 and standard deviation σ = 24. The cholesterol levels for a random sample of n = 9 individuals are measured and the sample mean x is determined. What is the z-score for a sample mean x = 180?

a. –3.75

b. –2.50

c. −0.83

d. 2.50

Ans – B

1. 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 - B

1. 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

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

The test – statistic used for comparing tow samples depends on the type of hypothesis test being performed. Here are some commonly used tests and their corresponding test statistics:

**Independent sample T-test**:-

It is used to compare the means of two independent samples.

The test statistic is calculates as:

T = (x1-x2)/s\_p\*sqrt(1/n1+1/n2))

Where x1 and x2 are the sample means, s\_p is the pooled standard deviation,n1 and n2 are sample sizes.

**Paired sample t-test:-**

It is used to compare the means of two related samples (eg:- pre-test and post – test). The test statistic is calculated as:

T =(x1 – x2)/(s-d/sqrt(n))

Where x1 and x2 are the sample means, s\_d is the sample standard deviation of the differences between pairs, n is the sample size.

**Z-test for proportions:-**

It is used to compare the proportions of two independent samples. The test statistic is calculated as:

Z = (p1-p2)/sqrt(p\*(1-p)\*(1/n1+1/n2))

Where p1 and p2 are the sample proportions, n1 and n2 are the sample sizes, and p is the pooled population.

**Chi – square test:-**

It is used to test for independence between two categorical variable. The test statistic is calculated as:

Chi^2 = sum((O-E)^2/E

Where O is the observed frequency , E is the expected frequency , and the sum is taken overall cells in the contingency table.

Note that these are just a few examples and other tests may have different test statistics.

It’s important to choose the appropriate test for the research question and sample data.

1. **How do you find the sample mean difference?**

To find the sample mean difference, you first need to have tow samples from the some population or two different populations. Once you the two samples, follow these steps:

1.Calculate the mean of the first sample**(x̄1)** and the mean of second sample**(x̄2).**

2.Subtract the mean of the second sample from the mean of the first sample:

( **x̄1 - x̄2)**

The result is the sample mean difference between the two samples. This provides an estimate of the difference in means for the population from which the samples were drawn.

**For example**:-

If you have two samples of test scores for two different classes of students, you can find the sample difference in their test scores as follows:

1. Calculate the mean test score for calss 1(**x̄1)** and the mean test scorefor class **2(x̄2).**
2. Subtract the mean test score for class 2 from the mean test score for class **1: (x̄1- x̄2)**

The result is the sample mean difference in test scores between the two classes.

1. What is a two sample t test example?

A two – sample t-test is a statistical test used to compare the means of two independent samples to determine if they are statistically different from each other. Here is an example of a two – sample t-test.

Suppose a pharmaceutical company has developed a new medication that is supposed to reduce blood pressure. The company conducts a clinical trail to compare the effectiveness of the new medication with an existing medication. They randomly assign 50 patients to each medication group.

**After the trail the company obtains the following data: -**

* For the new medication group, the sample mean blood pressure is 120mmHg with a standard deviation of 10mmHg.
* For the existing medication group, the sample mean blood pressure is 130 mmHg with a standard deviation of 12mmHg.

The company want to know if here is a statistically significant difference the mean blood pressures of the two medication groups. They can perform a two – sample t-test to answer this question.

The null hypothesis is that there is no difference between the mean blood pressures of the two medication groups. They can perform a two -sample t-test to answer this question.

The null hypothesis is that there is no difference between the mean blood pressures of the two medication groups. The alternative hypothesis is that there is a difference between the mean blood pressures of the two medication groups.

The company can use the following formula to calculate the t-statistic for the two - sample t-test:

T = (x1 – x2)/(s\_p\*sqrt(1/n1+1/n2))

Where x1 and x2 are the sample means, s-p is the pooled standard deviation, n1 and n2 are the sample sizes.

Using the data given above, the t-statistic is calculated as:

T = (120-130)/(sqrt(((10^2)/50)+((12^2)/50))) = -3.33

Assuming a significance level of 0.05 and 98 degrees of freedom, the critical t-value(-3.33) is less than the critical t-value(-1.984), we can reject the null hypothesis and conclude that there is a statistically significant difference between the mean blood pressure of the two medication groups. In other words, the new medications more effective in reducing blood pressure than the existing medication.