

## STATISTICS WORKSHEET-4

Q1to Q15 are descriptive types. Answer in brief.

1. What is central limit theorem and why is it important?

**ANS:** The CLT is a statistical theory that states that - if you take a sufficiently large sample size from a population with a finite level of variance, the mean of all [samples](#) from that population will be roughly equal to the population

Central Limit Theorem, also known as the CLT, is a crucial pillar of statistics and [machine learning](#). It is at the heart of hypothesis testing. In this tutorial, you will understand the concept of the CLT and its applications.

### Significance of Central Limit Theorem

The CLT has several applications. Look at the places where you can use it.

- Political/election polling is a great example of how you can use CLT. These polls are used to estimate the number of people who support a specific candidate. You may have seen these results with confidence intervals on news channels. The CLT aids in this calculation.
- You use the CLT in various census fields to calculate various population details, such as family income, electricity consumption, individual salaries, and so on.

2. What is sampling? How many sampling methods do you know?

**ANS:** The sample is the group of individuals who will actually participate in the research. To draw valid conclusions from your results, you have to carefully decide how you will select a sample that is representative of the group as a whole. This is called a **sampling method**.

There are two primary types of sampling methods that you can use in your research:

- **Probability sampling** involves random selection, allowing you to make strong statistical inferences about the whole group.
- **Non-probability sampling** involves non-random selection based on convenience or other criteria, allowing you to easily collect data.

3. What is the difference between type I and type II error?

**ANS: Type I error** is a false positive conclusion, while a **Type II error** is a false negative conclusion. Making a statistical decision always involves uncertainties, so the risks of making these errors are unavoidable in [hypothesis testing](#).

The probability of making a Type I error is the [significance level](#), or alpha ( $\alpha$ ), while the probability of making a Type II error is beta ( $\beta$ ). These risks can be minimized through careful planning in your study design.

4. What do you understand by the term Normal distribution?

**ANS:** A normal distribution is a type of continuous probability distribution in which most data points cluster toward the middle of the range, while the rest taper off symmetrically toward either extreme. The middle of the range is also known as the mean of the distribution.

The normal distribution is also known as a Gaussian distribution or [probability bell curve](#). It is symmetric about the mean and indicates that values near the mean occur more frequently than the values that are farther away from the mean.

5. What is correlation and covariance in statistics?

**ANS:** Covariance and correlation are two terms that are exactly opposite to each other. However, they both are used in statistics and regression analysis. Covariance shows us how the two variables vary, whereas correlation shows us the relationship and how they are related.

Correlation and covariance are two statistical concepts used to determine the relationship between two random variables. Correlation defines how a change in one variable will impact the other, while covariance defines how two items vary together.

6. Differentiate between univariate ,Biavariate,and multivariate analysis.

**ANS:**

7. What do you understand by sensitivity and how would you calculate it?

**ANS:**

8. What is hypothesis testing? What is H0 and H1? What is H0 and H1 for two-tail test?

**ANS:**

9. What is quantitative data and qualitative data?

**ANS:**

10. How to calculate range and interquartile range?

**ANS:**

11. What do you understand by bell curve distribution ?

**ANS:**

12. Mention one method to find outliers.

**ANS:**

13. What is p-value in hypothesis testing?

**ANS:**

14. What is the Binomial Probability Formula?

**ANS:**

15. Explain ANOVA and it's applications.

**ANS:**