Central Limit Theorem

It states that no matter the distribution of population the sampling distribution of the mean will approximate a Normal Distribution mean is the same as the Population mean.

It allows us to perform tests, solve problems and make inferences using the Normal Distribution even when the population is not normally distributed.

It provides generalization about a population from a sample.

**Sampling distribution**

When we make a dataset for various means for different samples for same population and then make a distribution is known as Sampling Distribution of the mean and if we do calculate the mean of our sample mean dataset will result in approximation of population mean.

**Standard Errors**

Standard Errors show variability of sample mean. It shows how well do we extract the approximate mean. Standard error decreases when sample size increases.

Estimators and Estimates

Estimators of a population parameter approximation depending solely on sample information. Specific value is called Estimate

Point Estimates are Single Number

Confidence Interval (provides much more information and are preferred when making information) estimate are intervals.

Estimators (how to estimate) Parameters (What to estimate) Estimate (concrete Result)

They tell us about Efficiency and bias

Confidence Interval

Represents much more accurate representation of reality represented as =

For example, 98% of confidence intervals means there is only 2% chance that the population parameter is outside range. value will be in between 0 and 1.

**– Reliability factor , + Reliability Factor**

We calculate the Confidence interval in 2 main situations

1. Population variance is Known (Z’s Statistics)
2. Population variance is unknown (T’s Statistics)

**Population Variance is Known**

Formula =

where, is the Sample Mean (The point estimate)

is the Reliability factor Z (Common term used is Critical value) is the Statistics and is the Confidence Interval

Some common confidence intervals were: 90%, 95%, 99%

Z’ Statistics is related to Standard Normal Distribution.

**Population Variance is Unknown**

Formula **=**

**Margin of Error**

Margin of error is the term used to describe the range added to and subtracted from the sample mean to calculate the confidence interval.

For population variance is known **=**

for population variance is unknown **=**