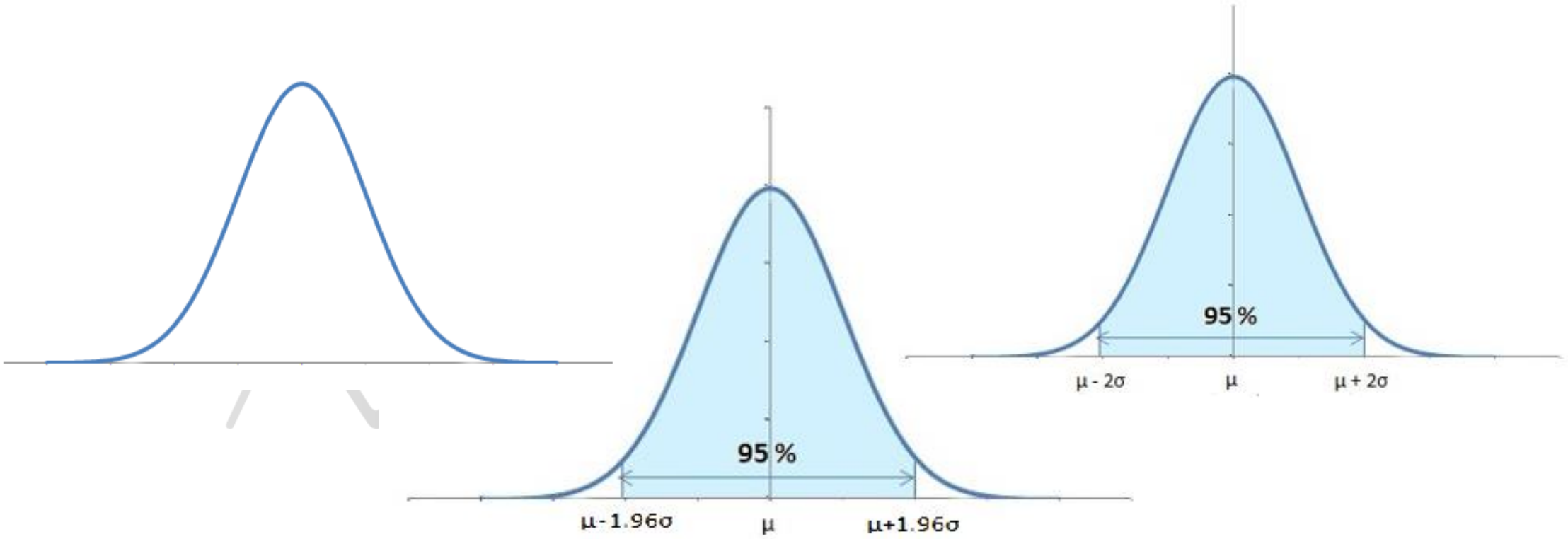
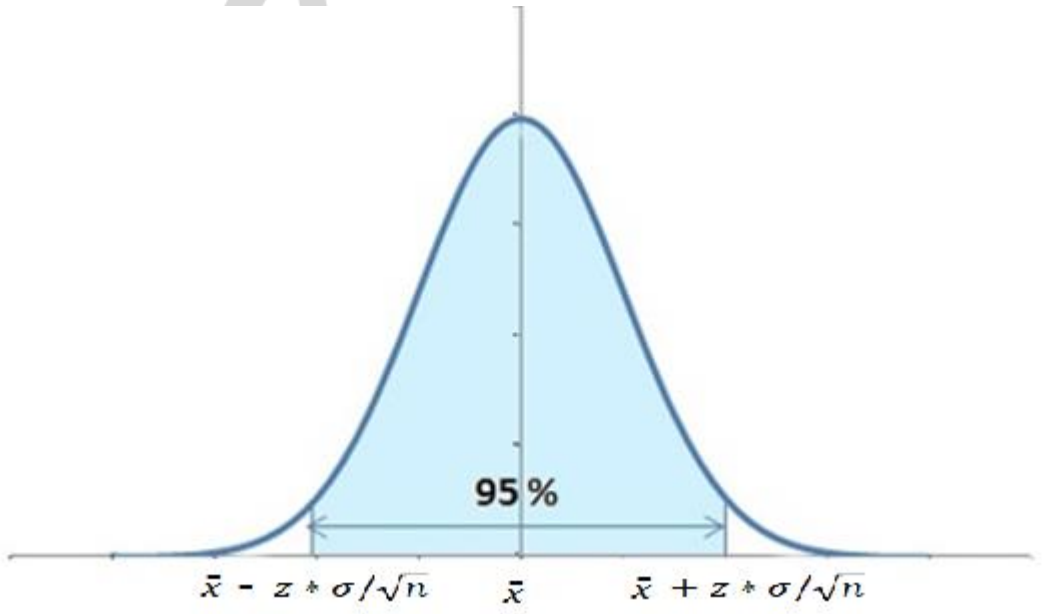
Confidence Interval and the margin of error

Confidence Interval



Confidence Interval

The confidence interval is a type of interval estimate from the sampling distribution which gives a range of values in which the population statistic may lie



Confidence Interval

- The mathematical formula for confidence Interval is –

$$C.I = \bar{X} \pm Z_{a/2}\, \sigma/\sqrt{n}$$

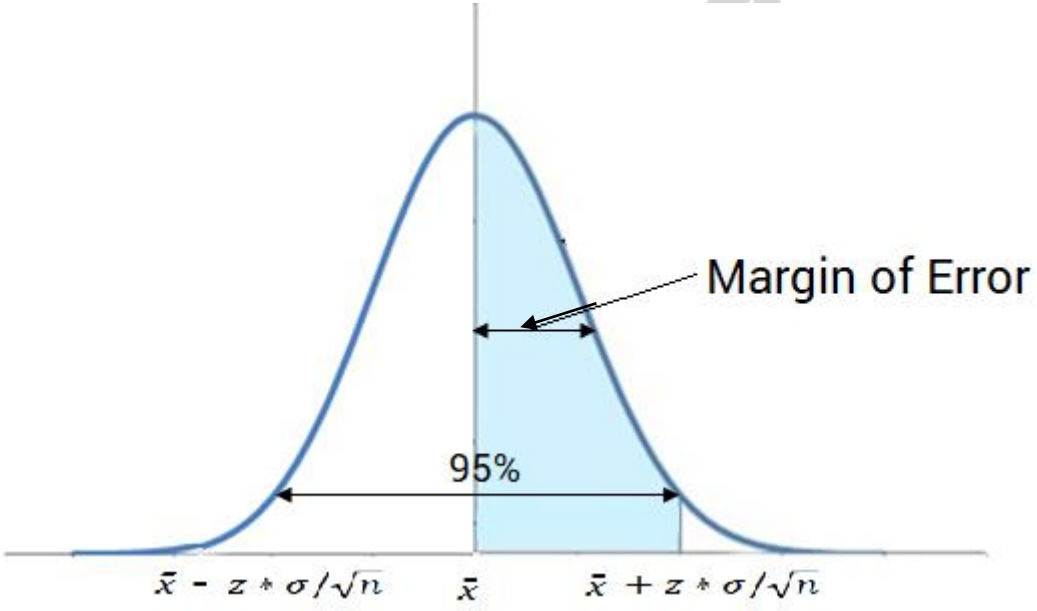
- Here is the sample mean, is the z value for desired confidence level, σ is the standard deviation of the sample while is the number of samples.

Confidence Interval

- Calculate the 95% confidence interval for a sample mean of 40 and sample standard deviation of 40 with sample size equal to 100.

Margin of Errors

- Half of confidence interval
- Here z* is the margin of error



Margin of Error

- Margin of error is defined as the sampling error by the person who collected the data
- If the sample mean lies in the margin of error range then, it might be possible that its actual value is equal to the population mean and the difference is occurring by chance
- Anything outside the margin of error is considered **statistically significant.**
- Margin of error is half of the confidence interval
- Margin of error is on either side of the mean. It can be both positive and negative

Points to remember on Confidence Intervals

- Confidence Intervals can be built with difference degrees of confidence suitable to a user's needs like 70 %, 90% etc.
- Greater the sample size, smaller the Confidence Interval, i.e more accurate determination of population mean from the sample means and vice versa.
- There are different confidence intervals for different sample means. For example, a sample mean of 40 will have a different confidence interval compared to a sample mean of 45.
- By 95% Confidence Interval, we do not mean that the probability of a population mean will lie in an interval of 95%. Instead, 95% C.I means that 95% of the Interval estimates will contain the population statistic.