Confidence Interval Estimation – One Sample

Normal Population

σ known: $\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

σ unknown: $\bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$

Large Sample

σ known: $\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

σ unknown: $\bar{x} \pm z_{\alpha/2} \frac{s}{\sqrt{n}}$

Large Sample Confidence Interval for a population proportion

$$p \pm z_{\alpha/2} \sqrt{\frac{p(1-p)}{n}}$$

Required sample size

To estimate the mean, μ, with maximum error e and confidence $1 - \alpha$

$$n = \left(\frac{z_{\alpha/2}\ \sigma}{e} \right)^2$$

If σ is unknown

$$n = \left(\frac{z_{\alpha/2}\ s}{e} \right)^2$$

To estimate a population proportion, π, with maximum error e and confidence $1 - \alpha$

If we have a preliminary estimate p

$$n = \frac{z_{\alpha/2}^2\, p(1-p)}{e^2}$$

If we do <u>not</u> have a preliminary estimate p

$$n_{\max} = \frac{z_{\alpha/2}^2}{4e^2}$$