| Population Parameter | Sample Statistic | *Population Variance is Known* | | | Z vs. T Decision Rules & Degrees of Freedom |
|---|---|---|---|---|---|
| | | **Standard Deviation of the Sample Statistic (Standard Error)** | **Confidence Interval** | **Hypothesis Testing** | |
| Mean μ | $\bar{x}$ | $SE = \frac{\sigma}{\sqrt{n}}$ | $CI = \bar{x} \pm Z_{(\frac{1-C}{2})} * SE$ | $Z = \frac{\bar{x} - \mu_0}{SE}$ | Use *s* as an estimate of $\sigma$ when $\sigma$ is unknown. Use T dist with n-1 DF or normal approx. if n is sufficiently large (~30) |
| Difference in means $\mu_1 - \mu_2$ | $\bar{x}_1 - \bar{x}_2$ | Pooled Variances: $SE = \sigma\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ Unequal Variances: $SE = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$ | $CI = (\bar{x}_1 - \bar{x}_2) \pm Z_{(\frac{1-C}{2})} * SE$ | $Z = \frac{(\bar{x}_1 - \bar{x}_2) - \mu_{diff}}{SE}$ | |
| Proportion *p* | *P* | $SE = \sqrt{\frac{p(1-p)}{n}}$ | $CI = P \pm Z_{(\frac{1-C}{2})} * SE$ | $Z = \frac{P - p_0}{SE}$ | Use P as an estimate of p when p is unknown. Use Z if nP>10 & n(1-P)>10 or p is known, else use T with n-1 DF |
| Difference in Proportions $p_1 - p_2$ | $P_1 - P_2$ | Assume unknown p's: $SE = \sqrt{\frac{P_1(1-P_1)}{n_1} + \frac{P_2(1-P_2)}{n_2}}$ | $CI = (P_1 - P_2) \pm Z_{(\frac{1-C}{2})} * SE$ | $Z = \frac{(P_1 - P_2) - p_{diff}}{SE}$ | |