- **Exact confidence interval for a normal mean μ when $\sigma^2 = \sigma_0^2$ is known:**

$$\overline{Y} \pm z_{\alpha/2}\left(\frac{\sigma_0}{\sqrt{n}}\right)$$

- **Large-sample confidence interval for a population mean μ:**

$$\overline{Y} \pm z_{\alpha/2}\left(\frac{S}{\sqrt{n}}\right)$$

- **Large-sample confidence interval for a population proportion p:**

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

- **Large-sample confidence interval for the difference of two population means $\mu_1 - \mu_2$:**

$$(\overline{Y}_{1+} - \overline{Y}_{2+}) \pm z_{\alpha/2}\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

- **Large-sample confidence interval for the difference of two population proportions $p_1 - p_2$:**

$$(\widehat{p}_1 - \widehat{p}_2) \pm z_{\alpha/2}\sqrt{\frac{\widehat{p}_1(1-\widehat{p}_1)}{n_1} + \frac{\widehat{p}_2(1-\widehat{p}_2)}{n_2}}$$

- **Small-sample confidence interval for a normal mean μ:**

$$\overline{Y} \pm t_{n-1,\alpha/2}\left(\frac{S}{\sqrt{n}}\right)$$

- **Small-sample confidence interval for the difference of two normal means $\mu_1 - \mu_2$ when $\sigma_1^2 = \sigma_2^2$ (equal population variances):**

$$(\overline{Y}_{1+} - \overline{Y}_{2+}) \pm t_{n_1+n_2-2,\alpha/2} S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$S_p^2 = \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1+n_2-2}$$

- **Small-sample approximate confidence interval for the difference of two normal means $\mu_1 - \mu_2$ when $\sigma_1^2 \neq \sigma_2^2$ (unequal population variances):**

$$(\overline{Y}_{1+} - \overline{Y}_{2+}) \pm t_{\nu,\alpha/2}\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

$$\nu \approx \frac{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)^2}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1-1} + \frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2-1}}$$

- **Exact confidence interval for a normal variance σ^2:**

$$\left[\frac{(n-1)S^2}{\chi^2_{n-1,\alpha/2}}, \frac{(n-1)S^2}{\chi^2_{n-1,1-\alpha/2}}\right]$$

- **Exact confidence interval for the ratio of two normal variances σ_2^2/σ_1^2:**

$$\left(\frac{S_2^2}{S_1^2} \times F_{n_1-1,n_2-1,1-\alpha/2}, \frac{S_2^2}{S_1^2} \times F_{n_1-1,n_2-1,\alpha/2}\right)$$