1. **Estimating population mean μ with the assumption that σ is known (Normal distribution):**

   - **Confidence interval:**
   $$\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}}$$
   Table C gives z^* for a given $C\%$ confidence level.
   - **Significance tests for the null hypothesis $H_0 : \mu = \mu_0$:**
   The one sample z test statistic:
   $$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$$
   Find the P-value of z using Table A, do some algebra depending on your alternative hypothesis H_a.

2. **Estimating population mean μ with the assumption that σ is not known (t distribution):**

   - **The one sample t confidence interval:**
   $$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$$
   Table C gives t^* for a given $C\%$ confidence level and $df = n - 1$.
   - **One sample significance tests for the null hypothesis $H_0 : \mu = \mu_0$:**
   The one sample t statistic
   $$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}, \text{ with } df = n - 1$$
   Find the P-value of t using Table C with $df = n - 1$, take in consideration whether you have a one sided or two sided alternative hypothesis.
   - **Matched pairs:** Use the above one sample procedures to analyze matched pairs by taking the difference within each mathced pair to produce a single sample.

3. **Comparing two population means μ_1 and μ_2 with the assumption that σ_1 and σ_2 are not known (t distribution):**

   - **The two sample t confidence interval:**
   $$\bar{x}_1 - \bar{x}_2 \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$
   Table C gives t^* for a given $C\%$ confidence level and $df = \min(n_1 - 1, n_2 - 1)$.

- **Two sample significance tests for the null hypothesis H_0 : $\mu_1 = \mu_2$:**
  The two sample t statistic

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}, \text{ with } df = \min(n_1 - 1, n_2 - 1)$$

  Find the P-value of t using Table C, take in consideration whether you have a one sided or two sided alternative hypothesis.

4. **Estimating population proportion from a sample proportion $\hat{p}$ (Normal distribution):**

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

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

- **Significance test for proportion**
  The z test statistic for the null hypothesis $H_0 : p = p_0$ is

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

5. **Comparing two proportions**

- **The two sample t confidence interval for $p_1 - p_2$:**

$$\hat{p}_1 - \hat{p}_2 \pm z^* \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$$

- **Two sample signficance tests for $H_0 : p_1 = p_2$:**
  Use the pooled sample proportion

$$\hat{p} = \frac{\text{number of successes in both samples combined}}{\text{number of individuals in both samples combined}}$$

  Then the z-statistic is

$$z = \frac{\hat{p_1} - \hat{p_2}}{\sqrt{\hat{p}(1 - \hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}.$$