	Assumptions & Comments	Hypothesis Test	Confidence Interval
One Mean	▪ Independent observations ▪ Sample from normal distribution ▪ Variance unknown ▪ Large or small sample	$t^* = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}} \sim t_{n-1}$	$\overline{x} \pm t_{n-1;\alpha/2} \dfrac{s}{\sqrt{n}}$
One Mean	▪ *iid* sample ▪ Variance unknown ▪ Large sample (CLT applies) ▪ Approximate results *Note*: Use of *z* requires CLT and a couple of other advanced stats theorems. R uses *t* with large and ugly *df*.	$z^* = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}} \sim N(0,1)$ OR $t^* = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}} \sim t_{n-1}$	$\overline{x} \pm z_{\alpha/2} \dfrac{s}{\sqrt{n}}$ OR $\overline{x} \pm t_{n-1;\alpha/2} \dfrac{s}{\sqrt{n}}$
One Proportion	▪ Independent observations ▪ P(S) constant for all trials ▪ Large sample; *np*>5 & *n(1-p)*>5	$z^* = \dfrac{\hat{p} - p_0}{\sqrt{p_0 q_0/n}} \sim N(0,1)$	$\hat{p} \pm z_{\alpha/2}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$
One Variance	▪ Independent observations ▪ Sample from normal distribution ▪ Variance unknown ▪ Large or small sample	$\chi^2 * = \dfrac{(n-1)s^2}{\sigma_0^2} \sim \chi^2_{n-1}$	$\left(\dfrac{(n-1)s^2}{\chi^2_{n-1;\alpha/2}}, \dfrac{(n-1)s^2}{\chi^2_{n-1;1-\alpha/2}}\right)$

	Assumptions & Comments	Hypothesis Test	Confidence Interval
Two Means	▪ Independent observations ▪ Sample from two normal distributions ▪ Variances unknown and equal ▪ Large or small sample	$t* = \frac{\overline{x}_1 - \overline{x}_2}{s_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \sim t_{n_1+n_2-2}$ $s_p^2 = \frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}$	$\overline{x}_1 - \overline{x}_2 \pm t_{n_1+n_2-2;\alpha/2} s_p \sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$
Two Means	▪ *iid* samples from each population ▪ All observations independent ▪ Variances both unknown (not assumed equal) ▪ Large samples (CLT applies) ▪ Approximate results *Note*: Use of *z* requires CLT and a couple of other advanced stats theorems. R uses *t* with large and ugly *df*.	$z^* = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}} \sim N(0,1)$ OR $t^* = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}} \sim t_{df}$	$\overline{x}_1 - \overline{x}_2 \pm z_{\alpha/2}\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$ OR $\overline{x}_1 - \overline{x}_2 \pm t_{df;\alpha/2}\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$
Two Means (paired)	▪ Paired observations; positive correlation between x and y ▪ Pairs independent of each other ▪ Difference between pairs have normal distribution ▪ Large or small samples	$t^* = \frac{\overline{d}}{s_d/\sqrt{n}} \sim t_{n-1}$ $d = x - y$ n pairs of observations	$\overline{d} \pm t_{n-1;\alpha/2}\frac{s_d}{\sqrt{n}}$
Two Proportions	▪ Independent observations ▪ P(S) constant for all trials within each group ▪ Large samples; $np>5$ & $n(1-p)>5$	$z* = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$ $\hat{p} = \frac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1+n_2}$	$\hat{p}_1 - \hat{p}_2 \pm z_{\alpha/2}\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1}+\frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
Two Variances	▪ Independent observations ▪ Samples from two normal distribution ▪ Variances both unknown ▪ Large or small sample	$F* = \frac{s_1^2}{s_2^2} \sim F_{n_1-1,n_2-1}$ $s_1^2 > s_2^2$	$\left(\frac{s_1^2}{s_2^2 F_U}, \frac{s_1^2}{s_2^2 F_L}\right)$