Number of Variables	Types of Variables	Name of Test	What is this test testing?	Conditions	Hypothesis, Test Statistics, P-value	Confidence Interval
1 variable	Categorical	One Sample Proportion Test	Whether a Population proportion is different from some hypothesized value (p_0)	Random Sample, $\hat{p}$ approximately normally distributed n(p_0) ≥ 10 and n($1-p_0$) ≥ 10	$H_0: p = p_0$ $H_a: p \neq p_0 \ or >< $ $z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$ P-value = normalcdf(lower,upper,0,1)	$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ Where $\hat{p} = \frac{x}{n}$ And both n(p_0) ≥ 10 n($1-p_0$) ≥ 10
	Quantitative	One Sample t-test	Whether there is a difference between a mean and some hypothesized value (μ_0)	Random Sample, $\bar{X}$ approximately normally distributed, If n<30 then population needs to be normal	$H_0: \mu = \mu_0$ $H_a: \mu \neq \mu_0 \ or >< $ $t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$ P-value = tcdf(lower,upper,df)	$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$ $df = n - 1$
2 variables	Both Categorical	Chi-Square	Compares the variables in a contingency table to see if they are related	No cell should have a value less than 1, 20% of the cells have expected values greater than 5	H_0: There is no association between… H_a: There is association between … $X^2 = \sum \frac{(observed - expected)^2}{expected}$ p-value = X^2cdf(lower,upper,df)	N/A ☺
		2-sample proportion	Whether the two population proportions differ	Independent, Random Sample, $\hat{p}_1$ and $\hat{p}_1$, approximately normally distributed, n(p_1) ≥ 10 and n($1-p_1$) ≥ 10, n(p_2) ≥ 10 and n($1-p_2$) ≥ 10	$H_0: p_1 = p_2$ $H_a: p_1 \neq p_2 \ or >< $ $z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$ Where $\hat{p} = \frac{X_1 + X_2}{n_1 + n_2}$ p-value = normalcdf(lower,upper,0,1)	$(\hat{p}_1 - \hat{p}_2) \pm$ $z^* \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$ $n_1 \hat{p}_1 \geq 10$ and $n_1 (1 - \hat{p}_1) \geq 10$ $n_2 \hat{p}_2 \geq 10$ and $n_2 (1 - \hat{p}_2) \geq 10$

	One of Each	2-sample t-test	Whether there is an average difference between two groups	Independent, Random Sample, $\overline{X_1}$ and $\overline{X_2}$, approximately normally distributed, if n_1 or $n_2 \leq 30$ then the population needs to be normal	$H_0: \mu_1 = \mu_2$ $H_a: \mu_1 \neq \mu_2 \; or \; >\,<$ $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2})}}$ P-value = tcdf(lower,upper,df)	$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ $DF = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{n_2 - 1}}$
2 variables		Anova F-test	Whether at least one group mean differs from the others	Independent, population distributions are approximately normal, population variances are equal	$H_0: \mu_1 = \mu_2 = \mu_3$ $H_a: at\ least\ on\ mean\ differs$ $F = \frac{MSB}{MSE}$ P-value = fcdf(lower,upper,df1,df2)	PostHOC Analysis $\frac{\alpha}{m}$, Bonferroni's adjustment for the independent samples t-test
	Both Quantitative	Paired t-test	Is the mean difference between two sets of observations zero?	Random, data is paired, sampling distribution of pairwise differences approximately normally distributed	$H_0: \mu_d = 0$ $H_a: \mu_d \neq 0 \; or \; >\,<$ $t = \frac{\bar{X}_d}{\frac{S_d}{\sqrt{n}}}$ where $S_d = \sqrt{\frac{\sum(d_i - \bar{d})^2}{n-1}}$ P-value = tcdf(lower,upper,df)	$\bar{d} \pm t^* \frac{S_d}{\sqrt{n}}$ df = n – 1
		Simple Linear Regression	Whether there is a relationship between two quantitative variables	Constant variance, Linear relationship, Independence, Y-values are approximately normally distributed	Population Regression Model: $Y = \beta_0 + \beta_1 X_1 + \varepsilon$ Overall F-test: $F = \frac{MSR}{MSE}$ P-value = fcdf(lower,upper,df1,df2) OR $t = \frac{b_1}{s_{b_1}}; df = n - 2$	$b_1 \pm t^* (\text{standard error of } b_1)$