Summary of Hypothesis Tests

Test	**Parameter**	**Null Hypothesis**[2]	**Test Statistic**[3]	**Assumptions**[4]	*R*
one-proportion z-test	proportion (p)	$H_0 : p = p_0$	$z = \frac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$	at least 15 expected successes and 15 expected failures under H_0	*prop.test*
one-sample t-test	mean (μ)	$H_0 : \mu = \mu_0$	$t = \frac{\bar{x}-\mu_0}{\frac{s}{\sqrt{n}}}$, df $= n - 1$	$n \geq 30$ or observations are from a normal distribution	*t.test*
two-proprtion z-test	Difference in proportions ($p_1 - p_2$)	$H_0 : p_1 - p_2 = 0$	$z = \frac{\hat{p_1}-\hat{p_2}}{\sqrt{p(1-p)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$, and $p = \frac{n_1\hat{p_1}+n_2\hat{p_2}}{n_1+n_2}$.	independent samples, at least 15 expected successes and 15 expected failures under H_0	*prop.test*
two-sample t-test	Difference in means ($\mu_1 - \mu_2$)	$H_0 : \mu_1 - \mu_2 = 0$	$t = \frac{\bar{x_1}-\bar{x_2}}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$, df by Sattherthwaite formula	independent samples with unequal variances, there are at least 30 observations for each group or observations are from a normal distribution	*t.test*

[2]The alternative hypothesis H_A is obtained by replacing '=' with $\neq$ (two-tailed alternative). One-tailed alternative hypotheses are not discussed and are not recommended.
[3]See table below
[4]All analyses assume that the observations come from a random process (i.e., a random sample or an experiment where the treatment is randomly assigned)

[3]**Test statistic**	**Description**
z	follows the standard normal distribution under H_0
t	follows the t distribution with given degrees of freedom under H_0