

The Table!

	Categorical Data proportions, percents, counts	Numeric Data means, correlation, regression, slope
Basic Tests 1 or 2 groups, categories, choices, factors, levels, or responses 2 SD Rule applies Can be left, right, or both tails	<p>one proportion (3.1) $p=0.40$ <small>1 group - 2 choices</small> 40% of people favor banning cell phones on public transportation. Less than 20% of people approve of the job Congress is doing.</p> <p>two proportions (3.2) $p_1=p_2$ <small>2 groups - 2 choices</small> Men are more likely than women to chew tobacco. Blacks are less likely than Whites to trust police. Gender is not a factor in whether or not a person owns a gun.</p>	<p>one mean (4.1) $\mu=61.5$ <small>1 group - 1 numeric variable</small> The mean weight of Skittles bag is 61.5g.</p> <p>paired means (4.2) $\mu_d=0$ <small>1 group - 2 numeric variables - checking equality</small> The size of a person's foot is equal to the length of their forearm.</p> <p>two independent means (4.3) $\mu_1=\mu_2$ <small>2 groups - 1 numeric variable</small> Women have higher pain tolerance than men.</p> <p>correlation (5.x) $\rho=0$ <small>1 group - 2 numeric variables - checking relationship</small> The length of someone's index finger is related to their height.</p>
Distribution	Normal (Z)	Student's T
Test Statistic	$z = \frac{\text{observed} - \text{expected}}{\text{standard deviation}}$	$t = \frac{\text{observed} - \text{expected}}{\text{standard error}}$
Advanced Tests more than 2 groups, categories, choices, factors, levels, or responses Always right tail	<p>goodness of fit (3.3) <small>1 group - 3 or more choices</small> 25% of people are Republican, 35% are Democrats, and 40% are independents. The colors of Skittles are equally distributed. The 68-95-99.7 rule applies to a set of data.</p> <p>test for association (3.4) <small>2 grouping variables, more than 2 choices</small> Race and political party are associated. A person's religion and gender are related. A person's race is a factor in whether or not they were stopped by the police.</p>	<p>one-way ANOVA (4.4) $\mu_1=\mu_2=\mu_3$ <small>more than 2 groups - 1 numeric variable</small> Race is not a factor in a person's SAT score.</p> <p>two-way ANOVA <small>2 grouping variables, 1 numeric variable</small> Race and gender are related to income.</p> <p>simple regression (5.x) $\beta_1=0$ <small>1 response variable, 1 predictor variable - see correlation</small> A person's age is related to their income.</p> <p>multiple regression (6.x) $\beta_1=\beta_2=\beta_3=0$ <small>1 response variable, more than 1 predictor variable</small> A student's score on a test is related to the time spent studying, the amount of sleep the night before, and their SAT score.</p>
Distribution	Chi-Square	F
Test Statistic	$\chi^2 = \sum \left(\frac{\text{observed} - \text{expected}}{\sqrt{\text{expected}}} \right)^2$	$F = \frac{\text{Variance}_1}{\text{Variance}_2} = \frac{MS_{\text{source}}}{MS_{\text{error}}}$

The **symbolic representation** is for a typical null hypothesis and may not match the **example claims**. Example claims may be the null or the alternative hypothesis. There are multiple ways to interpret things: 1 group may mean 1 way of classifying the data and 2 groups may mean 2 ways of classifying the data. There is more to hypothesis testing than will fit on a single page unless you make the font so small you cannot read it, so this should be considered a quick guide.