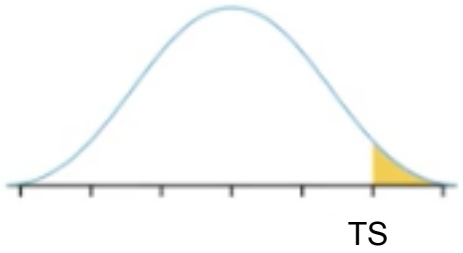
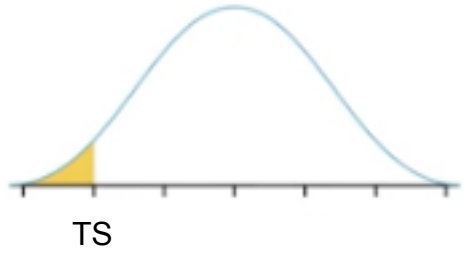
Tool: Summary Stats and Testing Reference

Test the Hypothesis

Instructions:
Use the tables below to remind yourself of the formulae and testing procedures for hypothesis testing.

Steps in the Hypothesis Testing Process	
Using a Test Statistic (TS)	Using a Confidence Interval (CI)
Step 1: Define H_0 and H_a. Step 2: Use data to calculate a Test Statistic (TS). Step 3: Given H_0, how likely is TS? Step 4: Reject or accept H_0.	Step 1: Define H_0 and H_a. Step 2: Use a sample statistic and standard error to build a Confidence Interval (CI). Step 3: Is the null value within the Confidence Interval? Step 4: Reject or accept H_0.

Calculating Standard Error		
Statistic	**Formula**	**Notes**
Standard Error for Qualitative (Categorical) Variables	$SE_{\hat{p}} = \sqrt{\frac{p_0(1-p_0)}{n}}$	Use the null proportion, not the sample proportion.
Standard Error for any variable	$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$	Use the sample standard deviation, p-value calculated using T-distribution.
Test Statistic (TS)	$TS = \frac{\bar{x} - x_0}{SE_{\bar{x}}}$ $TS = \frac{\hat{p} - p_0}{SE_{\hat{p}}}$	Shows how many standard errors away from the null the sample statistic is.
Confidence Interval (CI)	for 95%: $CI = \bar{x} \pm 2SE_{\bar{x}}$ for 95%: $CI = \hat{p} \pm 2SE_{\hat{p}}$	$\pm 3SE$ for 99% CI $\pm 1SE$ for 68% CI

Tailed Testing Options		
Tail	**When to Use**	**Visual Reference**
Right Tail	When the alternative you're trying to support has a value greater than the null. e.g. $H_0 = \mu_0$ and $H_a > \mu_0$ or $H_0 = p_0$ and $H_a > p_0$	
Left Tail	When the alternative you're trying to support has a value less than the null. e.g. $H_0 = \mu_0$ and $H_a < \mu_0$ or $H_0 = p_0$ and $H_a < p_0$	
Two Tail	When the alternative you're trying to support has a value greater than or less than the null. e.g. $H_0 = \mu_0$ and $H_a \neq \mu_0$ or $H_0 = p_0$ and $H_a \neq p_0$