Hypothesis Test Statistics and Confidence Intervals

1 - α Confidence Interval **Point Estimate $\pm$ Maximum Error E**		**Hypothesis Test Value (Statistic)** **NULL Hypothesis:** Use the statement containing the condition of equality (= ≤ ≥), either directly or implied, as the Null Hypothesis H_o.

Single Population

(TI-83, TI-86) (TI-83, TI-86)

One Sample for mean μ (σ is known)

(ZInterval, ZInt1)		(Z-Test, ZTest)
$\bar{x} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$	Use the *Normal* Z-Table for the critical value Z	$z = \frac{\bar{x}-\mu}{\sigma/\sqrt{n}}$

One Sample for mean μ (σ is unknown)

(TInterval, TInt1)		(T-Test, TTest)
$\bar{x} \pm t_{\alpha/2}\frac{s}{\sqrt{n}}$	$df = n - 1$ Use the t-distribution Table for the critical value t	$t = \frac{\bar{x}-\mu}{s/\sqrt{n}}$

One Sample for Proportion p

(1-PropZInt, ZPin1)		(1-PropZTest, ZPrp1)
$\hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$	Use the *Normal* Z-Table for the critical value Z	$z = \frac{\hat{p}-p}{\sqrt{pq/n}}$

Dual Populations

(TI-83, TI-86) (TI-83, TI-86)

Dependent Paired for μ_d

(TInterval, TInt1)		(T-Test, TTest)
$\bar{d} \pm t_{\alpha/2}\frac{s_d}{\sqrt{n}}$	$df = n - 1$ Use the t-distribution Table for the critical value t	$t = \frac{\bar{d}-\mu_d}{s_d/\sqrt{n}}$ Use $\mu_d = 0$

Two Independent Samples for $\mu_1 - \mu_2$ (σ_1, σ_2 are known)

(2-SampZInt, ZInt2)		(2-SampZTest, Zsam2)
$(\bar{x}_1-\bar{x}_2) \pm z_{\alpha/2}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}$	Use the *Normal* Z-Table for the critical value Z	$z = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}}$ Use $\mu_1-\mu_2 = 0$

Two Independent Samples for $\mu_1 - \mu_2$ (σ_1, σ_2 are unknown)

(2-SampTInt, TInt2)		(2-SampTTest, Tsam2)
$(\bar{x}_1-\bar{x}_2) \pm t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$	$df =$ *smaller of* $n_1 - 1$ *or* $n_2 - 1$ Use the t-distribution Table for the critical value t **Use "NOT POOLED" on the calculator.**	$t = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$ Use $\mu_1-\mu_2 = 0$

Two Independent Samples for Proportions $p_1 - p_2$

(2-PropZInt, ZPin2)		(2-PropZTest, ZPrp2)
$(\hat{p}_1-\hat{p}_2) \pm z_{\alpha/2}\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1}+\frac{\hat{p}_2\hat{q}_2}{n_2}}$	Use the *Normal* Z-Table for the critical value Z $n\bar{p} \geq 5$ *and* $n\bar{q} \geq 5$ for both samples	$z = \frac{(\hat{p}_1-\hat{p}_2)-(p_1-p_2)}{\sqrt{\frac{\bar{p}\bar{q}}{n_1}+\frac{\bar{p}\bar{q}}{n_2}}}$ Use $p_1-p_2 = 0$ where, $\bar{p} = \frac{x_1+x_2}{n_1+n_2}$ or $\bar{p} = \frac{n_1\hat{p}_1+n_2\hat{p}_2}{n_1+n_2}$ $\bar{q} = 1-\bar{p}$

1-Prop: $p = \frac{X}{N}$ $\hat{p} = \frac{x}{n}$ $q = 1-p$ $\hat{q} = 1-\hat{p}$

Dual Prop: $p_1 = \frac{X_1}{N_1}$ $p_2 = \frac{X_2}{N_2}$ $\hat{p}_1 = \frac{x_1}{n_1}$ $\hat{p}_2 = \frac{x_2}{n_2}$ $\bar{p} = \frac{x_1+x_2}{n_1+n_2}$ or $\bar{p} = \frac{n_1\hat{p}_1+n_2\hat{p}_2}{n_1+n_2}$

$q_1 = 1-p_1$ $q_2 = 1-p_2$ $\hat{q}_1 = 1-\hat{p}_1$ $\hat{q}_2 = 1-\hat{p}_2$ $\bar{q} = 1-\bar{p}$

Sample Size Determination

for Mean μ		for the Proportion p
$n = \frac{z_{\alpha/2}^2\sigma^2}{E^2} = \left(\frac{z_{\alpha/2}\sigma}{E}\right)^2$	(round up)	$n = \frac{z_{\alpha/2}^2 pq}{E^2}$ or use $n = \frac{z_{\alpha/2}^2(.25)}{E^2}$ (if p, q unknown)