Formulas - Hypothesis Tests and Confidence Intervals - Triola Text

$1 - \alpha$ Confidence Interval **Point Estimate ± Maximum Error E**	**Hypothesis Test Value (Statistic)** **NULL Hypothesis:** Use the statement containing the condition of equality ($= \le \ge$), either directly or implied, as the Null Hypothesis H_o.
Single Population **(TI-83, TI-86)**	**Single Population** **(TI-83, TI-86)**
One Large Sample for μ (ZInterval, ZInt1) $n > 30$ or σ known $\bar{x} \pm z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$	**One Large Sample for μ** (Z-Test, ZTest) $n > 30$ or σ known $z = \dfrac{\bar{x} - \mu}{\sigma / \sqrt{n}}$
One Small Sample for μ (TInterval, TInt1) $n \le 30$ and σ unknown, df = n - 1 $\bar{x} \pm t_{\alpha/2} \dfrac{s}{\sqrt{n}}$	**One Small Sample for μ** (T-Test, TTest) $n \le 30$ and σ unknown, df = n - 1 $t = \dfrac{\bar{x} - \mu}{s / \sqrt{n}}$
One Large Sample Proportion for p (1-PropZInt, ZPin1) $\hat{p} \pm z_{\alpha/2} \sqrt{\dfrac{\hat{p}\hat{q}}{n}}$	**One Large Sample Proportion for p** (1-PropZTest, ZPrp1) $z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$
Dual Population **(TI-83, TI-86)**	**Dual Population** **(TI-83, TI-86)**
Small Dependent Paired for μ_d, df = $n - 1$ (TInterval, TInt1) $\bar{d} \pm t_{\alpha/2} \dfrac{s_d}{\sqrt{n}}$	**Small Dependent Paired for μ_d,** df = $n - 1$ (T-Test, TTest) $t = \dfrac{\bar{d} - \mu_d}{s_d / \sqrt{n}}$
Two Large Ind. Samples for $\mu_1 - \mu_2$ (2-SampZInt, ZInt2) $n_1 > 30$, $n_2 > 30$ or σ_1, σ_2 known $(\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2} \sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}$	**Two Large Ind. Samples for $\mu_1 - \mu_2$** (2-SampZTest, Zsam2) $n_1 > 30$, $n_2 > 30$ or σ_1, σ_2 known $z = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$
Two Small Ind. Samples for $\mu_1 - \mu_2$ (2-SampTInt, TInt2) unequal variances and $n_1 \le 30$ or $n_2 \le 30$ and σ_1, σ_2 unknown $(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} \sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}$ df = smaller of n_1 - 1 or n_2 - 1 **(Pooled No)**	**Two Small Ind. Samples for $\mu_1 - \mu_2$** (2-SampTTest, Tsam2) unequal variances and $n_1 \le 30$ or $n_2 \le 30$ and σ_1, σ_2 unknown $t = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$ **(Pooled No)**
Two Large Ind. Sam. Prop for $p_1 - p_2$ (2-PropZInt, ZPin2) $(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2} \sqrt{\dfrac{\hat{p}_1\hat{q}_1}{n_1} + \dfrac{\hat{p}_2\hat{q}_2}{n_2}}$	**Two Large Ind. Sam. Prop for $p_1 - p_2$** (2-PropZTest, ZPrp2) $z = \dfrac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\dfrac{\bar{p}\bar{q}}{n_1} + \dfrac{\bar{p}\bar{q}}{n_2}}}$ where, $\bar{p} = \dfrac{x_1 + x_2}{n_1 + n_2}$ or $\bar{p} = \dfrac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1 + n_2}$ $\quad \bar{q} = 1 - \bar{p}$

1-Prop $p = \dfrac{X}{N}$ $\quad \hat{p} = \dfrac{x}{n}$ $\quad q = 1 - p$ $\quad \hat{q} = 1 - \hat{p}$

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

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

Sample Size Determination, *P*-Value and Margin of Error

Sample Size for the Mean μ	**Sample Size for the Proportion p**
$n = \dfrac{z_{\alpha/2}^2 \sigma^2}{E^2}$ (round up)	$n = \dfrac{z_{\alpha/2}^2 pq}{E^2}$ or use $n = \dfrac{z_{\alpha/2}^2 (.25)}{E^2}$ if p unknown (round up)
Margin of Error $= \pm 1.96 \dfrac{\sigma}{\sqrt{n}}$	***p* -Value** If $\alpha < p$, **FAIL TO REJECT H_0**; otherwise ($\alpha > p$), **REJECT H_0**.