

Inference Formulas & Conditions

Situation	Confidence Interval	Significance Test	Conditions
<p>1 mean (σ known)</p>	$\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}}$ <p style="text-align: center;">TI-83+ ZInterval</p>	$H_0: \mu = \mu_0$ $Z = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}}$ <p style="text-align: center;">TI-83+ Z-Test</p>	<ol style="list-style-type: none"> 1. SRS 2. population size $\geq 10n$ 3. population is normal or large sample size ($n \geq 40$)
<p>1 mean (σ not known)</p> <p style="text-align: center;">or</p> <p>2 means (matched pairs)</p>	$\bar{x} \pm t_{n-1}^* \frac{s}{\sqrt{n}}$ <p style="text-align: center;">TI-83+ TInterval</p>	$H_0: \mu = \mu_0$ $t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$ <p style="text-align: center;">TI-83+ T-Test</p>	<ol style="list-style-type: none"> 1. SRS 2. population size $\geq 10n$ 3. population is normal or large sample size ($n \geq 40$) or moderate sample size ($15 \leq n \leq 40$) with moderate skewness or outliers
<p>2 means (independent)</p>	$(\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ <p style="text-align: center;">TI-83+ 2-SampTInt</p>	$H_0: \mu_1 = \mu_2$ $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$ <p style="text-align: center;">TI-83+ 2-SampTTest</p>	<ol style="list-style-type: none"> 1. SRS 2. population size $\geq 10n$ 3. population is normal or large sample size ($(n_1 + n_2) \geq 40$) or moderate sample size ($15 \leq (n_1 + n_2) \leq 40$) with moderate skewness or outliers 4. independently chosen samples

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<p>1 proportion</p>	$\hat{p} \pm z^* \sqrt{\frac{\hat{p}\hat{q}}{n}}$ <p style="text-align: center;">TI-83+ 1-PropZInt</p>	$H_0: p = p_0$ $z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0q_0}{n}}}$ <p style="text-align: center;">TI-83+ 1-PropZTest</p>	<ol style="list-style-type: none"> 1. SRS 2. population size $\geq 10n$ 3. ST: $np_0 \geq 10$ & $nq_0 \geq 10$ CI: $n\hat{p} \geq 10$ & $n\hat{q} \geq 10$
<p>2 proportions</p>	$(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$ <p style="text-align: center;">TI-83+ 2-PropZInt</p>	$H_0: p_1 = p_2$ $z = \frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\hat{p}\hat{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$ <p style="text-align: center;">TI-83+ 2-PropZTest</p>	<ol style="list-style-type: none"> 1. SRS 2. population size $\geq 10n$ 3. independently chosen samples 4. ST: $n_1\hat{p} \geq 5$ & $n_1\hat{q} \geq 5$ & $n_2\hat{p} \geq 5$ & $n_2\hat{q} \geq 5$ CI: $n_1\hat{p}_1 \geq 5$ & $n_1\hat{q}_1 \geq 5$ & $n_2\hat{p}_2 \geq 5$ & $n_2\hat{q}_2 \geq 5$
<p>More than 2 Proportions</p> <p>Two-Way Table</p>		$H_0: \text{All of the proportions are the same.}$ $X^2 = \sum \frac{(O - E)^2}{E}$ <p style="text-align: center;">df = (r-1)(c-1) r = rows, c = columns</p> <p style="text-align: center;">TI-83+ χ^2-Test</p>	<ol style="list-style-type: none"> 1. SRS 2. independently chosen samples 3. all expected counts are ≥ 5

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<p>More than 2 Proportions</p> <p>One-Way Table</p> <p>Goodness of Fit</p>		<p>H_0: All of the proportions are the same.</p> $X^2 = \sum \frac{(O - E)^2}{E}$ <p>df = n - 1</p>	<ol style="list-style-type: none"> 1. SRS 2. independently chosen samples 3. all expected counts are ≥ 5
<p>Regression Slope</p> <p>$(\mu y = \alpha + \beta x)$</p>	<p>$b \pm SE_b$</p> $SE_b = \frac{\sqrt{\frac{1}{n-2} \sum (y - \hat{y})^2}}{\sqrt{\sum (x - \bar{x})^2}}$	<p>$H_0: \beta = 0$</p> $t = \frac{b}{SE_b}$ <p>TI-83+ LinRegTTest</p>	<ol style="list-style-type: none"> 1. y responses are independent¹ 2. true relationship is linear 3. standard deviation about the true regression line is constant 4. response varies normally

¹ Repeated observations on the same individual are not allowed.