Statistical Inference Summary Chart

Testing What?	How Many Samples?	Name of Statistical Inference (HT or CI)	Assumptions/ Conditions	Sample Statistic	Parameter of interest	Standard Deviation (SD) or Standard Error (SE)	Sampling Distribution Model	Formula for Test Statistic (HT)	Formula for CI	TI-83+ / TI-84
Proportion	One Sample	One Sample Proportion z Test/CI	1. Independent Random Sample 2. $np \geq 10$ & $n(1-p) \geq 10$ for sampling distribution to be approximately normal. 3. Sample size <10% of population	$\hat{p}$	p (or π)	SD $\sqrt{\frac{p(1-p)}{n}}$ SE $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$		$z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$	$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$	STAT TESTS 5: 1-PropZTest A: 1-PropZInt
Proportion	Two Samples	Difference of Two Sample Proportions z Test/CI	1. Independent Random Sample 2. All 4 products verified. $n_1p_1 \geq 10$ & $n_1(1-p_1) \geq 10$ $n_2p_2 \geq 10$ & $n_2(1-p_2) \geq 10$ for sampling distribution to be approximately normal. 3. Sample size <10% of population	$\hat{p}_1 - \hat{p}_2$	$p_1 - p_2$ (or $\pi_1 - \pi_1$)	SD $\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$ SE $\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$		$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}}$	$\hat{p}_1 - \hat{p}_2 \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$	STAT TESTS 6: 2-PropZTest B: 2-PropZInt

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Linear Association	One Sample of Paired Numerical Data (x, y)	Slope t-Test (or Linear Regression t-Test)	1. Scatterplot looks linear. 2. Errors are independent (no apparent pattern in residual plot) 3. Errors are normally distributed as seen in histogram of residuals. 4. Variability of the errors are constant (residual plot has constant spread)	b_1	β_1	SE $\frac{s_{b_1}}{\sqrt{n}}$		$t = \frac{b_1 - \beta_1}{\frac{s_{b_1}}{\sqrt{n}}}$ df = n – 2 where n is the number of pairs (x, y)	$b_1 \pm t^* \left(\frac{s_{b_1}}{\sqrt{n}}\right)$	STAT TESTS F: LinRegTTest (E on TI83+) G: LinRegTint (not on TI-83+)
Distribution	One Sample of Categorical Data	χ^2 Goodness of Fit Test	1. Data are counts 2. All expected counts are ≥ 5. Verify these. 3. Data in sample are independent and randomly sampled					$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$ df = k – 1 where k is the number of categories (cells) of variable.		STAT TESTS D: X^2GOF-Test (not on TI83+)
Distribution	Many Independent Samples of 1 Categorical Variables	χ^2 Test of Homogeneity	1. Data are counts 2. All expected counts are ≥ 5. Verify these. 3. Data in sample are independent and randomly sampled					$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$ df = (r – 1)(c – 1) where r is the # of rows and c is the # of columns in table.		STAT TESTS C: X^2-Test
Independence (No Association)	One Sample of Two Categorical Variables	χ^2 Test of Independence	1. Data are counts 2. All expected counts are ≥ 5. Verify these. 3. Data in sample are independent and randomly sampled					$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$ df = (r – 1)(c – 1) where r is the # of rows and c is the # of columns in table.		STAT TESTS C: X^2-Test

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Mean	One Sample	One Sample Mean *t* Test/CI	1. Random Sample 2. Sample from normally distributed population or sample size sufficiently large (≥ 30) so the sampling distribution of sample mean will be approximately normal Data: check boxplot or histogram for outliers or skewness. 3. Sample size <10% of population [σ is not known]	$\bar{x}$	μ	SE $\frac{s}{\sqrt{n}}$		$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$ df = n – 1 where n is sample size	$\bar{x} \pm t^* \left(\frac{s}{\sqrt{n}}\right)$	STAT TESTS 2: T-Test 8: TInterval
Mean	One Sample of Differences Between Matched Pairs	One Sample Matched Pair *t* Test/CI	1. Random Sample 2. Sample from normally distributed population or sample size sufficiently large (≥ 30) so the sampling distribution of sample mean will be approximately normal Data: check boxplot or histogram for outliers or skewness. 3. Sample size <10% of population [σ is not known]	$\bar{x}_{dif}$	μ_{dif}	SE $\frac{s_{dif}}{\sqrt{n}}$		$t = \frac{\bar{x}_{dif} - \mu_{dif}}{\frac{s_{dif}}{\sqrt{n}}}$ df = n – 1 where n is the number of pairs	$\bar{x}_{dif} \pm t^* \left(\frac{s_{dif}}{\sqrt{n}}\right)$	STAT TESTS 2: T-Test 8: TInterval
Means	Independent Samples	Difference of Two Means *t* Test/CI	1. Random Sample 2. Sample from normally distributed population or sample size sufficiently large (≥ 30) so the sampling distribution of sample mean will be approximately normal Data: check boxplots or histograms for outliers or skewness. 3. Sample size <10% of population [σ is not known]	$\bar{x}_1 - \bar{x}_2$	$\mu_1 - \mu_2$	SE $\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$		$t = \frac{(\bar{x}_1 - \bar{x}_1) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$ df is found on the calculator	$(\bar{x}_1 - \bar{x}_1) \pm t^* \left(\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}\right)$	STAT TESTS 4: 2-SampTTest 8: TInterval