HYPOTHESIS TESTING & CONFIDENCE INTERVALS
ONE SAMPLE

INFERENCE PROCEDURE	CONDITIONS	TEST STATISTIC	CONFIDENCE INTERVAL	CALCULATOR
One Mean μ σ is known	SRS, large sample size (n > 30) OR small sample size with approx. normal pop. distribution (no outliers and very little skewness in sample)	$z = \dfrac{\bar{x} - \mu_0}{\left(\dfrac{\sigma}{\sqrt{n}}\right)}$	$\bar{x} \pm z^* \left(\dfrac{\sigma}{\sqrt{n}}\right)$	STAT→TESTS→Z-TEST OR STAT→TESTS→ZINTERVAL
One Mean μ σ is NOT known	SRS, large sample size (n > 30) OR small sample size with approx. normal pop. distribution (no outliers and very little skewness in sample)	$t = \dfrac{\bar{x} - \mu_0}{\left(\dfrac{s}{\sqrt{n}}\right)}$ df = n - 1	$\bar{x} \pm t^* \left(\dfrac{s}{\sqrt{n}}\right)$ df = n - 1	STAT→TESTS→T-TEST OR STAT→TESTS→TINTERVAL
Paired Differences μ_{diff} Where *diff* = $x_1 - x_2$	dependent samples, large sample size (n > 30) OR small sample size with approx. normal pop. distribution (no outliers and very little skewness in sample)	$t = \dfrac{\bar{x}_{diff} - \mu_0}{\left(\dfrac{s_{diff}}{n}\right)}$ df = n - 1 where n is the number of *pairs*	$\bar{x}_{diff} \pm t^* \left(\dfrac{s_{diff}}{n}\right)$ df = n - 1 where n is the number of *pairs*	Create differences first STAT→TESTS→T-TEST OR STAT→TESTS→TINTERVAL using diff values
One proportion *p*	SRS, $10n \le N$, $np_0 \ge 10$, $n(1 - p_0) \ge 10$	$z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$	$\hat{p} \pm z^* \sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$	STAT→TESTS→1-PropZTest OR STAT→TESTS→1-PropZInt

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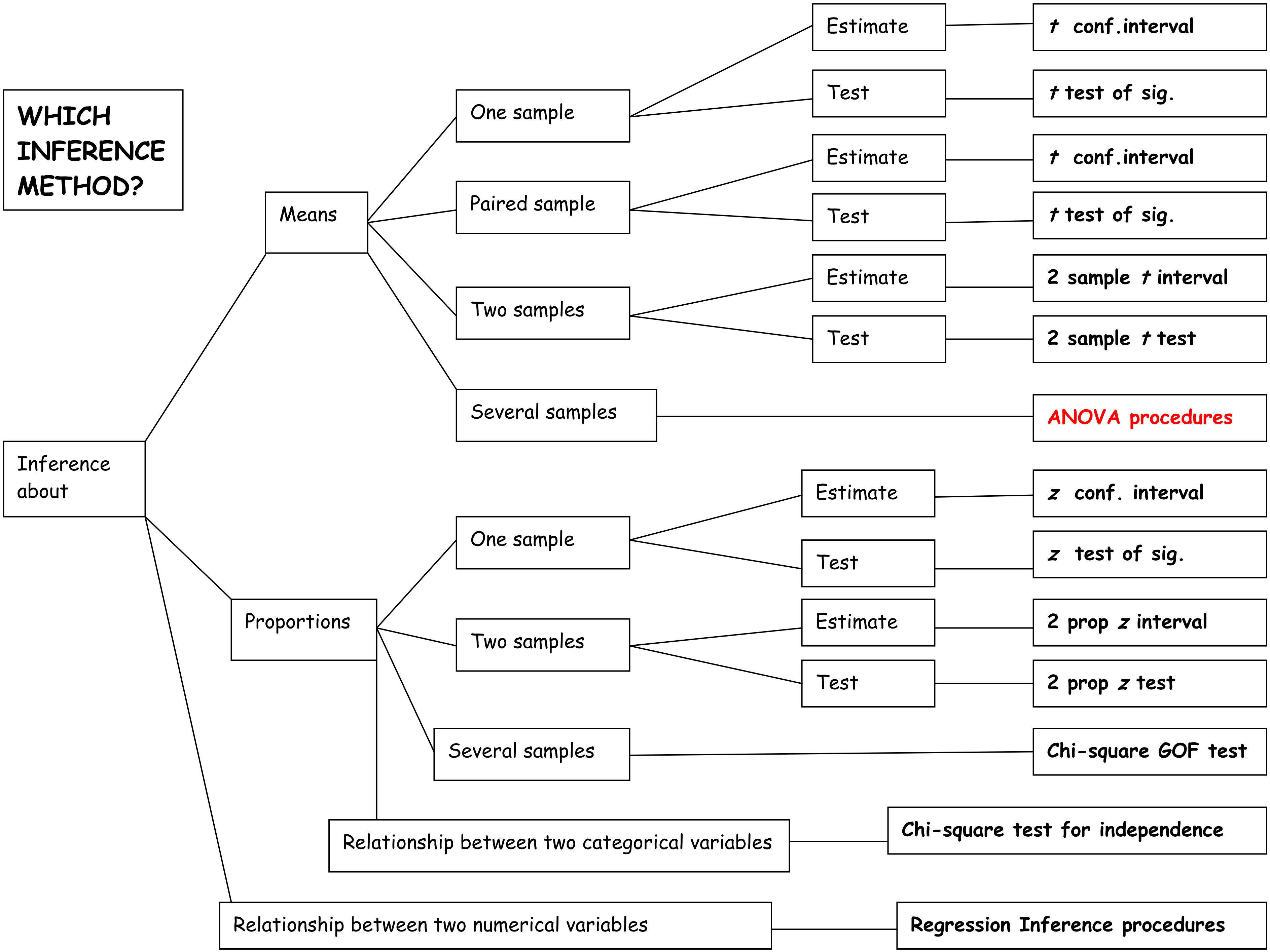
HYPOTHESIS TESTING & CONFIDENCE INTERVALS
TWO SAMPLE

INFERENCE PROCEDURE	CONDITIONS	TEST STATISTIC	CONFIDENCE INTERVAL	CALCULATOR
Two Means $\mu_1 - \mu_2$ σ_1, σ_2 are known	Independent SRS, large sample sizes (n > 30) OR small sample sizes with approx. normal pop. distribution (no outliers and very little skewness in both samples)	$z = \dfrac{(\bar{x}_1 - \bar{x}_2) - value_0}{\sqrt{\dfrac{(\sigma_1)^2}{n_1} + \dfrac{(\sigma_2)^2}{n_2}}}$	$(\bar{x}_1 - \bar{x}_2) \pm$ $z^* \sqrt{\dfrac{(\sigma_1)^2}{n_1} + \dfrac{(\sigma_2)^2}{n_2}}$	STAT→TESTS→ Z-TEST OR STAT→TESTS→ ZINTERVAL
Two Means $\mu_1 - \mu_2$ σ_1, σ_2 are NOT known Use Non-pooled test	Independent SRS, large sample sizes (n > 30) OR small sample sizes with approx. normal pop. distribution (no outliers and very little skewness in both samples)	$t = \dfrac{(\bar{x}_1 - \bar{x}_2) - value_0}{\sqrt{\dfrac{(s_1)^2}{n_1} + \dfrac{(s_2)^2}{n_2}}}$ df = ugly formula (use software)	$(\bar{x}_1 - \bar{x}_2) \pm$ $t^* \sqrt{\dfrac{(s_1)^2}{n_1} + \dfrac{(s_2)^2}{n_2}}$ df = ugly formula (use software)	STAT→TESTS→ T-TEST OR STAT→TESTS→ TINTERVAL
Two proportion $p_1 - p_2$	Independent SRS, $10n \le N$, "successes" and "failures" are all ≥ 10 for both samples	$z = \dfrac{(\hat{p}_1 - \hat{p}_2) - value_0}{\sqrt{p_c(1-p_c)}\sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$ where $p_c = \dfrac{X_1 + X_2}{n_1 + n_2}$	$(\hat{p}_1 - \hat{p}_2) \pm$ $z^* \sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$	STAT→TESTS→ 2-PropZTest OR STAT→TESTS→ 2-PropZInt

HYPOTHESIS TESTING & CONFIDENCE INTERVALS
MULTI SAMPLE

INFERENCE PROCEDURE	CONDITIONS	TEST STATISTIC	OTHER INFORMATION	CALCULATOR
χ^2 **Goodness of Fit**	SRS, Each expected cell count ≥ 5	$\chi^2 = \sum \frac{(Obs - Exp)^2}{Exp}$ sum over all categories	k x 1 matrix of expected cell counts df = k - 1	Obs→L_1 Exp→L_2 $L_3 = ((L_1 - L_2)^2)/L_2$ List→Math→Sum(L_3) Distr→χ^2pdf(sum,df) OR STAT→TESTS→ χ^2GOF-TEST
χ^2 **Test** of Independence or Homogeneity	Each expected cell count ≥ 5, SRS (for independence) OR independent samples (for homogeneity)	$\chi^2 = \sum \frac{(Obs - Exp)^2}{Exp}$ sum over all cells	Expected cell value = $\frac{(row\ total)(column\ total)}{Grand\ Total}$ df = (#rows – 1)(#columns – 1)	Observed Counts in Matrix A: STAT→TESTS→χ^2TEST
Slope of the population regression line β	1. At any given x-value, y has a normal distribution with same variance. 2. The true relationship is linear 3. Observations are independent	$t = \frac{b - \beta_0}{SE_b}$ df = n - 2	$C.I. = b \pm t^* SE_b$ df = n - 2	STAT→TESTS→ LinRegTTest OR STAT→TESTS→ LinRegTInt



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