MATHEMATICS 201-510-LW
Business Statistics
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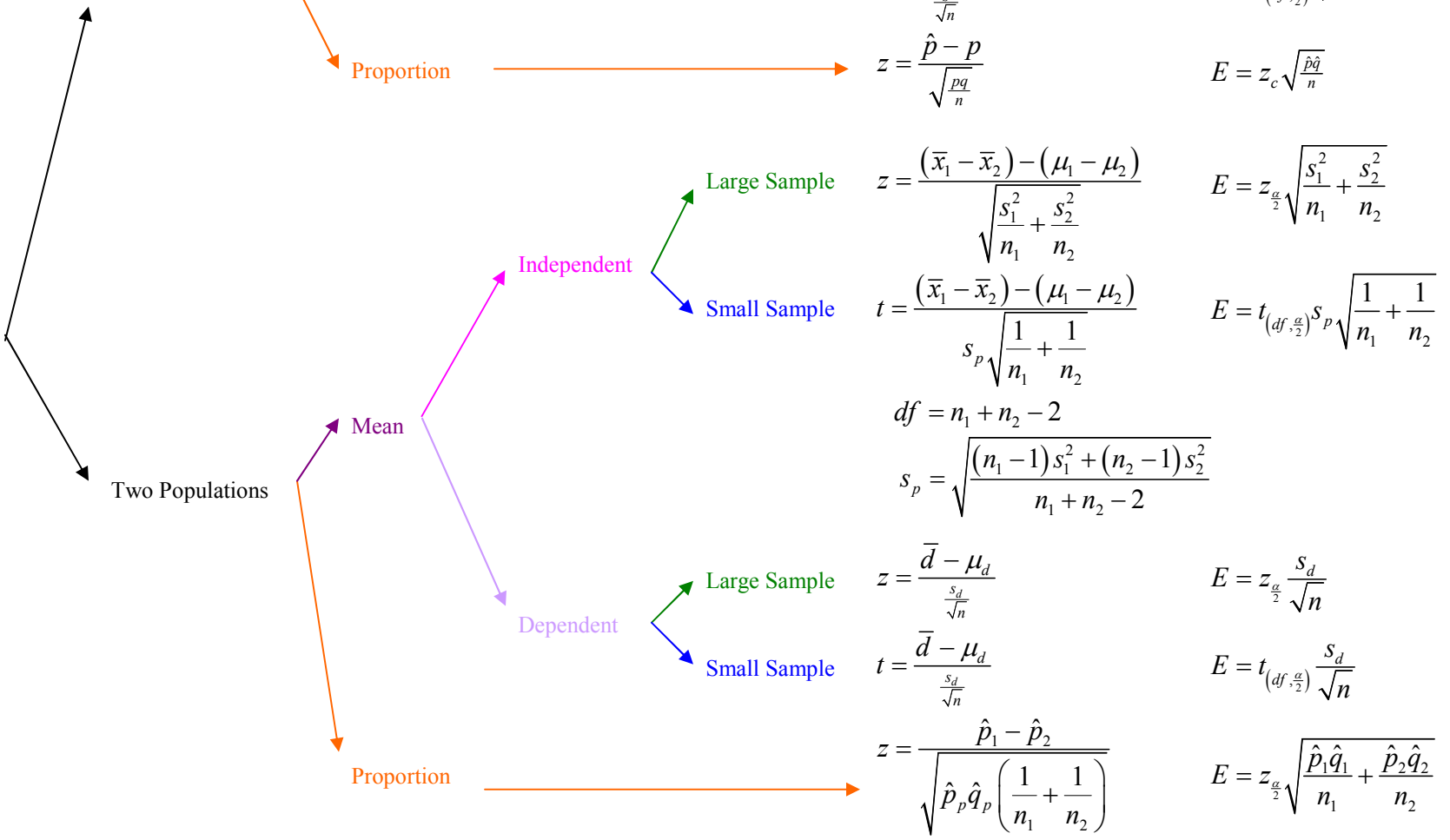
Inferences - Steps

	Confidence Intervals	**Hypothesis Testing: classical approach**	**Hypothesis Testing: *p*-value approach**
Step 1	Assumptions	Assumptions	Assumptions
Step 2	a) Identify the probability distribution used (the test statistic). b) Determine the level of confidence, $1-\alpha$	State the hypothesis H_o: (=) H_a: ($\neq$, < or >)	State the hypothesis H_o: (=) H_a: ($\neq$, < or >)
Step 3	Find the point estimate	a) Identify the test statistic to be used. b) Determine the kind of test and the level of significance α. (If it is not given, assume $\alpha = 0.05$) c) Determine the critical region(s) and the critical value(s).	a) Identify the test statistic to be used. b) Determine the kind of test and the level of significance α. (If it is not given, assume $\alpha = 0.05$)
Step 4	Determine the confidence interval a) Find the confidence coefficient $z_{\frac{\alpha}{2}}$ or $t_{(df,\frac{\alpha}{2})}$. b) Find the maximum error of estimate E. c) Find the confidence interval: $\bar{x} - E < \mu < \bar{x} + E$	Calculate the value of the test statistic	a) Calculate the value of the test statistic. b) Calculate the *p*-value
Step 5	Describe the results.	Determine the results a) Is the test statistic in the critical region? b) Make a decision about H_o. From (a): Yes $\Rightarrow$ reject H_o No $\Rightarrow$ fail to reject H_o. c) Write a conclusion.	Determine the results a) Is the *p*-value less than α? b) Make a decision about H_o. From (a): Yes $\Rightarrow$ reject H_o No $\Rightarrow$ fail to reject H_o. c) Write a conclusion.

Inferences – Decision Chart



	Hypothesis Testing	Confidence Intervals
One Population – Mean – Large Sample	$z = \dfrac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$	$E = z_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}}$
One Population – Mean – Small Sample	$t = \dfrac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$	$E = t_{(df, \frac{\alpha}{2})} \frac{s}{\sqrt{n}}$
One Population – Proportion	$z = \dfrac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$	$E = z_c \sqrt{\frac{\hat{p}\hat{q}}{n}}$
Two Populations – Mean – Independent – Large Sample	$z = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$	$E = z_{\frac{\alpha}{2}} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$
Two Populations – Mean – Independent – Small Sample	$t = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$	$E = t_{(df, \frac{\alpha}{2})} s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$
	$df = n_1 + n_2 - 2$	
	$s_p = \sqrt{\dfrac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$	
Two Populations – Mean – Dependent – Large Sample	$z = \dfrac{\bar{d} - \mu_d}{\frac{s_d}{\sqrt{n}}}$	$E = z_{\frac{\alpha}{2}} \dfrac{s_d}{\sqrt{n}}$
Two Populations – Mean – Dependent – Small Sample	$t = \dfrac{\bar{d} - \mu_d}{\frac{s_d}{\sqrt{n}}}$	$E = t_{(df, \frac{\alpha}{2})} \dfrac{s_d}{\sqrt{n}}$
Two Populations – Proportion	$z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}_p \hat{q}_p \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$	$E = z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$