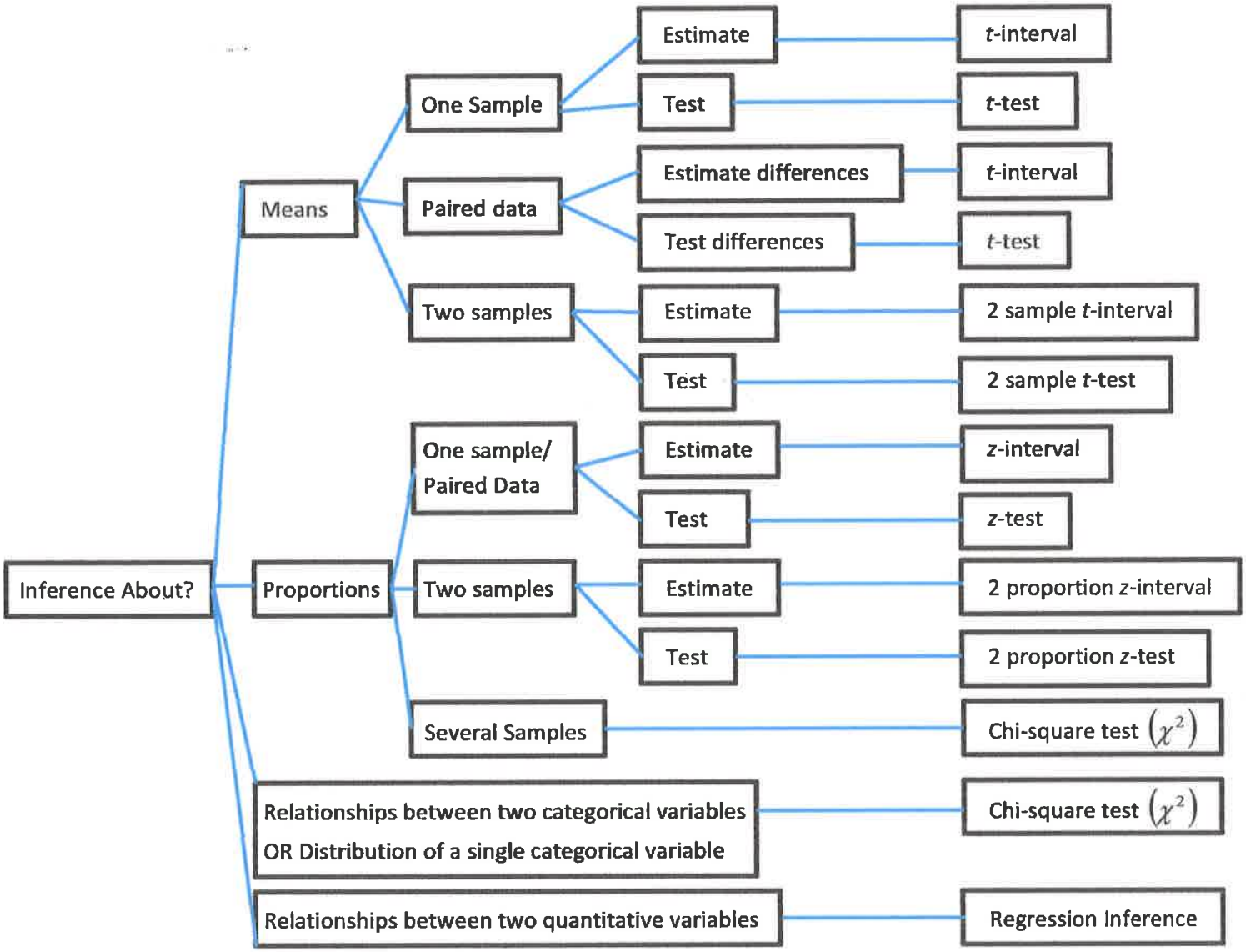
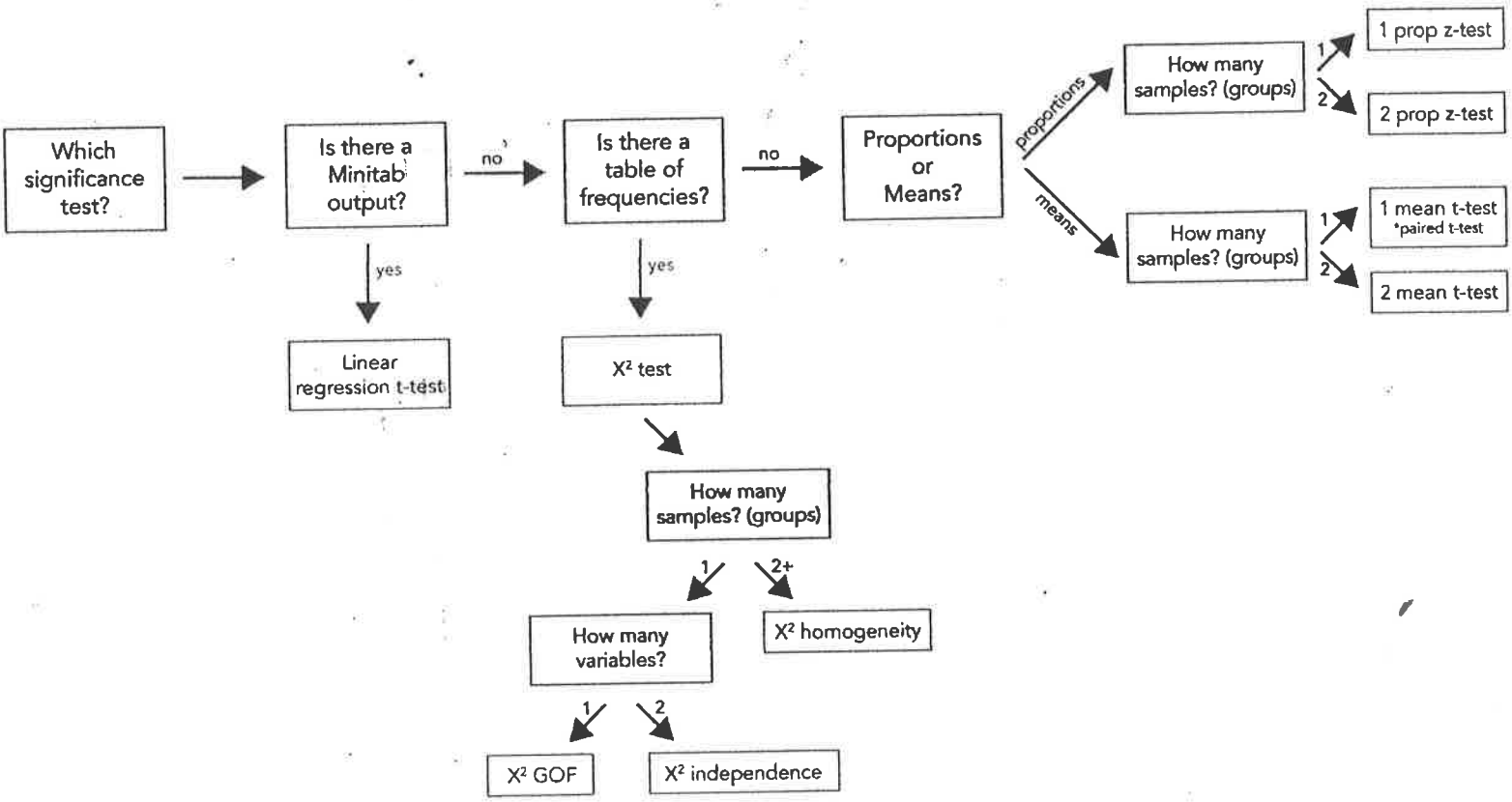
Which Inference Method Do We Use?



Work to be shown on Free Response Questions

1. Hypotheses: In words and in symbols
2. Statement and verification of assumptions
3. Name of procedure (or formula), with degrees of freedom, if applicable
4. Sketch of density function with null hypotheses (H_0) and sample marked
5. z/t/chi-square (χ^2) calculation (formula) with substituted values and result (mechanics)
6. P-value from calculator or table and decision (reject H_0/not enough evidence to reject H_0)
7. State your conclusion in context of the problem


Which significance test?
Is there a Minitab output?
yes
Linear regression t-test
no
Is there a table of frequencies?
yes
X² test
How many samples? (groups)
1
2+
How many variables?
1
2
X² GOF
X² independence
X² homogeneity
no
Proportions or Means?
proportions
How many samples? (groups)
1
2
1 prop z-test
2 prop z-test
means
How many samples? (groups)
1
2
1 mean t-test
*paired t-test
2 mean t-test

STATS MEDIC

Day 1 Review

Interpret Confidence Interval $(0.25, 0.32)$

We are 95% confident that the interval from 25% to 32% captures the (parameter in context) true proportion of people in the population that scored a 5 on the AP Exam.

Interpret Confidence **LEVEL** 95%

If we take many sample of size 800 (n) from this populations, about 95% of them will result in an interval that captures the (parameter in context) true proportion of people in the population that scored a 5 on the AP Exam.

Interpret the standard error of a statistic $SE(p) = 0.025$

When taking samples of size 800 and calculating the sample proportion, these sample proportions will typically be 2.5% away from the true proportion of people in the population that scored a 5 on the AP Exam.

$H_o : p = 0.80$ $H_a : p \neq 0.80$ $p =$ true population proportion of free throws that Rickey Bobby makes

Conclusion of Significant Test $p - value = 0.0075$

$p - value = 0.0075 < 0.05 = \alpha$, reject the H_o

We have convincing evidence that the (H_a with parameter with context) true population proportion of free throws that Ricky Bobby makes is not equal to 80%.

Interpret the P-value $p - value = 0.0075$

Assuming the true proportion of the shots Ricky Bobby makes is 0.80 (H_o is true) there is a 0.0075 (p-value) probability of getting a sample proportion of 0.64 (sample statistic we got) or one that is more extreme

Type I Error: H_o is true and we make a mistake! Type II Error: H_o is false and we make a mistake!

Interpret Type I error: *We conclude that Ricky Bobby lied about making 80% of his free throws; when in reality he really DOES make 80%.*

Interpret Type II error: *We do not have enough evidence to conclude Ricky Bobby makes less than 80% of his free throws; when in reality he does not make than 80%.*

Interpret Power: $power = 0.35$

Given that Rickey Bobby really doesn't make 80% of his shots, when sampling 100 shots, there is a 35% chance that we will correctly reject the null and find enough evidence to conclude that he does not make 80% of his free throws.

$$P(Type\ I\ error) = P(reject\ H_o | H_o\ is\ true) = \alpha = significance\ level$$

$$P(Type\ II\ error) = P(fail\ to\ reject\ H_o | H_o\ is\ false) = \beta$$

$$Confidence\ Level = P(fail\ to\ reject\ H_o | H_o\ is\ true) = 1 - \alpha$$

$$Power = P(correctly\ reject\ a\ false\ H_o) = P(reject\ H_o | H_o\ is\ false) = 1 - \beta$$

Day 1 Review

Comments and things to watch out for!

NOT CONSISTENT with what I was told this summer.

10% Condition

This is probably not needed, and you could skip on the free response section. It hasn't been a requirement on free response question in a very long time. Also, if you check the 10% condition on an experiment, it could ***cost you a point****! I personally would not skip it. But decide for yourself!*

Normal Check

This is a check for normality of the sampling distribution for z and t tests (not χ^2 *). You should state the word* ***normal*** *for the check, but do NOT state that the sample data is normal (it isn't). Rather state that the sample data is* ***symmetric with no outliers****.*

Name the Test vs. Formula for the Test

You must give the formal name of the test ***OR*** *the formula for the statistic/conf. interval. You do not need to do both. Give the name as it is easier and avoid the formula as it is easy to mess up details/notation.*

Don't forget linkage

Explicitly comparing the p-value to the alpha value is ***ALWAYS*** *required. Don't forget to write that step.*

Be careful how you word your conclusions.

1. *Never reference the sample in your parameter, hypotheses, or your conclusion. Don't use wording that implies you are talking about the sample!*

2. *You MUST MUST MUST reference the parameter in your conclusion. Have the word MEAN, PROPORTION, or SLOPE in your conclusions for your z and t procedures. (chi-sq you word differently).*

Good Wording

We are 94% confident that the interval from 44.1% to 49.9% captures the true population proportion of U.S. women that would say they don't get enough time to themselves.

Bad Wording

We are 94% confident that the interval from 44.1% to 49.9% captures the true population proportion of U.S. women that said they don't get enough time to themselves.

(this references the women in the sample)

Bad Wording

We are 94% confident that the interval from 44.1% to 49.9% captures the true number of U.S. women that would say they don't get enough time to themselves.

(this doesn't use the word proportion)