

(possibly incomplete list of)

Topics Covered from Chapters 6 to 9

Chapter 6 and Supplement: Sampling Distributions and Central Limit Theorem

A sampling distribution is the probability distribution for a sample statistic (like ex. 6.1 on pg. 256)

A statistic is an unbiased estimate for a parameter if the expected value of the statistic is equal to the parameter. For example $E(\bar{x}) = \mu$ so \bar{x} is an unbiased estimator for μ .

The Central Limit Theorem (in particular the boxes on pages 266 and 267).

n is generally large enough for the Central Limit Theorem if:

- i) always true if the original population is normal
- ii) generally ok if $n > 30$ if the population is continuous
- iii) $np \geq 5$ and $n(1-p) \geq 5$ for a binomial experiment

χ^2 is always positive and is skewed to the right.

$(n-1)s^2/\sigma^2$ is χ^2 with $(n-1)$ degrees of freedom for a random sample from a population that is normal with variance σ^2

How to use the χ^2 table

$\frac{\bar{x} - \mu}{s / \sqrt{n}}$ is t with $(n-1)$ degrees of freedom for a random sample from a population that is normal with mean μ

The t distribution is symmetric and has mean zero like the standard normal

When the degrees of freedom is large, the t is almost identical to the standard normal

When the degrees of freedom is small, the t distribution has thicker tails than the normal

How to use the t table

$(s_1^2/s_2^2)/(\sigma_1^2/\sigma_2^2)$ is F with n_1-1 and n_2-1 df for two random samples from populations that are normal with variances σ_1^2 and σ_2^2 respectively

Chapter 7 and Supplement: Confidence Intervals

$(1-\alpha)100\%$ confidence interval

How changing the sample size changes a confidence interval in general

How changing the α changes a confidence interval in general

How to get the formula for telling you what sample size you need for a certain length CI

How to make confidence intervals for means and percentages

How to make confidence intervals for the variance

Not: Confidence interval with F-distribution

Chapter 8: Tests of Hypothesis

null hypothesis = H_0

alternate hypothesis = H_A

Type I error

Type II error

significance level

α -level

rejection region

p-value: The probability of observing a test statistic as extreme as the one observed, or more, if H_0 is true. –or– The smallest α -level at which the null hypothesis is rejected.

power (how to use a power curve, not how to calculate one)

Type I error is controlled, power can only be measured

How changing α and the sample size affect the power

Figuring out what the null and alternate hypotheses are from the statement of the problem

How can we tell if the data comes from an approximately normal population?

Testing about μ when the population is normal
that the t -test for one mean is fairly robust

Testing about p when n is large

Testing about σ^2 when the population is normal
that the χ^2 test for one variance isn't very robust

Chapter 9: Inferences for Two Populations

Testing and confidence intervals for the difference ($\mu_1 - \mu_2$) between two means
when both populations are normal and have the same variance
when both populations are normal and the samples are large
when the data is paired

Testing about the differences between two proportions and the confidence intervals

That the F test is used for two variances when the populations are normal. It is not robust at all.
(You will not need to perform the test.)

Reading and using PROC TTEST output.