(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. 264)

A statistic is an unbiased estimate for a parameter if the expected value of the statistic is equal to the parameter. For example $E(\overline{x}) = \mu$ so $\overline{x}$ 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 (or, $p \pm 3\sigma_p$ does not include 0 or 1)

Using a normal distribution to approximate a binomial random variable (including the continuity correction) [from Chapter 5, section 5.5.]

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

$\dfrac{\overline{x} - \mu}{s / \sqrt{n}}$ is *t* with (n-1) degrees of freedom for a random sample from a population that 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

$(s^2_1/s^2_2)/(\sigma^2_1/\sigma^2_2)$ is *F* with n_1-1 and n_2-1 df for two random samples from populations that are normal with variances σ^2_1 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_O
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 at least as extreme as the one observed if H_0 is true.
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

<u>Not:</u> Power

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 SAS PROC TTEST output.