MS Module 12: Expected values and β's for ANOVA + unequal sample sizes (overview 2nd edition)

(The attached PDF file has better formatting.)

(Readings from the second 2nd edition of the Devore text.)

Reading: §11.3, More on Single-Factor ANOVA

Read the sub-section "An Alternative Description of the ANOVA Model." Know how to calculate the expected value of the treatment mean square. The final exam tests these expected values, but it does not test the *proof* of the formula for E(MSTr).

Read the sub-section "Power and β for the F Test." The power function is not tested on the final exam, but β and the noncentrality parameter are tested. Final exam problems may ask

- to compute the noncentrality parameter (given the set of $\alpha_i$; $\sigma^2$; the number of observations per group)
- to determine which set of $\alpha_i$ has the highest or lowest probability of a Type II error. (The value of β can not generally be computed by hand.) Know example 11.9, which illustrates how this topic is tested.

Read the sub-section on "Relationship of the *F* Test to the *t* Test," which says: "the single-factor ANOVA *F* test and the two-tailed pooled *t* test are equivalent: for any given data set, the *P*-values for the two tests will be identical, so the same conclusion will be reached by either test. (The test statistic values are related by $f = t^2$.) This topic is tested in the modules on regression analysis.

Read the sub-section on "Single-Factor ANOVA When Sample Sizes Are Unequal." Final exam problems do not have equal sample sizes for each group. A final exam problem may give data similar to Example 11.10 without the rightmost three columns, which you easily calculate.

Skip the sub-section on "Multiple Comparisons When Sample Sizes Are Unequal." Actuaries rarely (if ever) use the Tukey-Kramer procedure.

Skip the sub-section on "Data Transformation." The procedure makes sense, but it is too long to test on a multiple choice question final exam.

Read the sub-section on "A Random Effects Model." Final exam problems may ask to calculate the expected value of the mean square treatment for a random effects model.

Review example 11.12; make sure you understand how the degrees of freedom are computed (3 groups of 18 observations each) and the rest of the ANOVA table.

Review end of chapter exercises 27, 29b, 31, 32, and 33b.