

Answers to Conceptual Problems

Chapter 11 (One-Factor ANOVA: Fixed-Effects Model)

2. e (df and SS always add up to the total, MS do not)
4. a (lose 1 df from the total number of groups of the independent variable; $3 - 1 = 2$)
6. a (numerator df represents df_{betw} ; thus $3 - 1 = 2$)
8. a (for between source = $3 - 1 = 2$ and for within source = $30 - 3 = 27$)
10. d (equal sample sizes are not necessary)
12. true (probability of Type I error is less with one F test than with multiple t tests, as Type I error accumulates across the tests)
14. false (each independent variable is a factor, having two or more levels)
16. no (if the sample means are the same, then $MS_{\text{betw}} = 0$, but MS_{with} can be any non-negative value)
18. false (this refers to equal variances, not normality, being assumed)
20. yes (with equal means, SS_{betw} must be zero and thus F cannot possibly be significant)
22. false (with two groups the results of both procedures will always be the same)

Lomax, R. G., & Hahs-Vaughn, D. L. (2012). *An introduction to statistical concepts (3rd ed.)*. New York: Routledge/Taylor & Francis.

Answers to Computational Problems

2. $SS_{\text{betw}} = 22.55$, $SS_{\text{with}} = 23.99$, $SS_{\text{total}} = 46.54$, $df_{\text{betw}} = 3$, $df_{\text{with}} = 16$, $df_{\text{total}} = 19$, $MS_{\text{with}} = 1.50$, critical value 3.24 (reject H_0).
4. $SS_{\text{betw}} = 314.4$, $SS_{\text{with}} = 846$, $SS_{\text{total}} = 1,160.4$, $df_{\text{betw}} = 4$, $df_{\text{with}} = 35$, $df_{\text{total}} = 39$, $MS_{\text{betw}} = 78.6$, $MS_{\text{with}} = 24.1714$, $F = 3.2518$, critical value approximately 2.65 (reject H_0).