Key for First Fall Exam 2003

Problem A:

1. A: $Essay_i = \beta_0 + \varepsilon_i$ $H_0: \beta_0 = 6.5$
   C: $Essay_i = 6.5 + \varepsilon_i$ pa=1, pc=0

2. A: $Essay_i = \beta_0 + \beta_1 MBE_i + \varepsilon_i$ $H_0: \beta_1 = 0$
   C: $Essay_i = \beta_0 + \varepsilon_i$ pa=2, pc=1

3. MBEdev = MBE – mean of MBE
   A: $Essay_i = \beta_0 + \beta_1 MBEdev_i + \varepsilon_i$ $H_0: \beta_0 = 6.5$
   C: $Essay_i = 6.5 + \beta_1 MBEdev_i + \varepsilon_i$ pa=2, pc=1

4. A: $Essay_i = \beta_0 + \beta_1 MBE_i + \varepsilon_i$ $H_0: \beta_1 = .04$
   C: $Essay_i = \beta_0 + .04 MBE_i + \varepsilon_i$ pa=2, pc=1

5. Sexcode = +1 if male, -1 if female
   A: $Essay_i = \beta_0 + \beta_1 Sexcode_i + \varepsilon_i$ $H_0: \beta_1 = 0$
   C: $Essay_i = \beta_0 + \varepsilon_i$ pa=2, pc=1

6. Sexdummy = +1 if male, 0 if female
   A: $Essay_i = \beta_0 + \beta_1 Sexdummy_i + \varepsilon_i$ $H_0: \beta_1 = 6.5$
   C: $Essay_i = 6.5 + \beta_1 Sexdummy_i + \varepsilon_i$ pa=3, pc=1

7. A: $Essay_i = \beta_0 + \beta_1 MBE_i + \varepsilon_i$ if male $H_0: \beta_0 = \beta_2$ & $\beta_1 = \beta_3$
   $Essay_i = \beta_2 + \beta_3 MBE_i + \varepsilon_i$ if female
   C: $Essay_i = \beta_0 + \beta_1 MBE_i + \varepsilon_i$

8. Nonindependence – students within a law school are likely to be more similar than students between law schools.

Problem B:

1. A: $Between_i = \beta_0 + \varepsilon_i$ pa-pc=1
   C: $Between_i = 70 + \varepsilon_i$ n-pa= 220
   $SSR = 222(71.009-70)^2 = 226.014$
   SSE(A) = 36203.982
   PRE = .006; F* (1,221) = 1.380; crit F (1,221) = 3.89 [Note: there was no crit F for n-pa = 221 so I was conservative and used n-pa=200]
   There is no evidence that time between eruptions was different from 70 minutes on average.

2. b0 = 33.97 → If the duration of eruption was 0 minutes then we predict it will be 33.97 minutes until the next eruption.
   b1 = 10.36 → As the duration of eruption increases by 1 minute (1 unit on the duration variable), we predict the time between eruptions will increase by 10.36 minutes.

3. A: $Between_i = \beta_0 + \beta_1 Duration_i + \varepsilon_i$ pa-pc=1
   C: $Between_i = \beta_0 + \varepsilon_i$ n-pa= 220
   PRE = .770; F* (1,220) = 734.56; p = .0001
   Duration of eruption is a good predictor of time between eruptions. As eruption duration increases, so does time between eruptions.

4. r = sqrt R^2 = sqrt (.770) = .877

5. A: Between$_i$ = β_0+ β_1Duration$_i$ + ε_i pa-pc=1
   C: Between$_i$ = 70 + β_1Duration$_i$ + ε_i n-pa= 220
   SSE(A) = 8344.056; SSR = 226.014; SSE(C) = 8570.07
   PRE = .026; F*(1,220)=5.96; p < .05
   Controlling for duration of eruptions, the mean time between duration was significantly longer than 70 minutes.

Problem C:

1. b_o = 18.20 → the mean of the mean number of problems completed by subjects of experimenters expecting good performance and the mean number of problems completed by subjects of experimenters expecting poor performance is 18.20 problems.
   b_1 = .58 → the difference between the mean number of problems completed in the good expectations and poor expectations conditions is .58 problems.

2. A: Perf$_i$ = β_0+ β_1X$_i$ + ε_i pa-pc = 1
   C: Perf$_i$ = β_0+ ε_i n-pa = 15
   SSE(A) = 245.43; SSE(C) = 251.43
   PRE = .0224; F*(1,15) = .344; p=.57
   There is no evidence to suggest that the experimenter's expectations had any effect on participants' performance.

3. CI: .576 + or – sqrt[(4.54* 16.362)/(16*.26)] = .576 + or – 4.23
   We are 95% certain that the true difference between the two conditions' performance on these math problems is between –3.654 (that participants of experimenters with poor expectations perform 3.654 more problems than participants of experimenters with good expectations) and 4.806 (that participants of experimenters with good expectations perform 4.806 more problems than participants of experimenters with poor expectations).

4. The PRE is less than we would expect from a junk parameter.