

Problem Set 5 Answers
[35 points total]

Chapter 13

#8. a. Reducing the differences between treatments should reduce the value of MS_{between} and should lower the value of the F-ratio. **[1 POINT]**

b.

Source	SS	df	MS	
Between Treatments	10	2	5	
Within Treatments	24	12	2	$F(2,12) = 2.50$
Total	34	14		$F_{\text{critical}} = 3.88$

Fail to reject null; no significant differences among the three treatments. Notice that the F-ratio is substantially smaller than it was in #7.

[4 POINTS]

#10. a.

Source	SS	df	MS	
Between Treatments	72	2	36	
Within Treatments	36	9	4	$F(2,9) = 9.00$
Total	108	11		$F_{\text{critical}} = 4.26$

[4 POINTS]

b. Eta-squared is $72/108 = .667$, or 66.7% of the variance accounted for by the treatment. A larger difference between treatments produces a larger effect. **[2 POINTS]**

#14. a. With $df_{\text{between}} = 3$, there must be four treatment conditions. **[1 POINT]**

b. Adding the two df values (3 and 36) gives $df_{\text{total}} = 39$. Therefore, the total number of subjects must be $N = 40$. **[1 POINT]**

#20.

Source	SS	df	MS	
Between Treatments	40	2	20	
Within Treatments	84	21	4	$F(2,21) = 5.00$
Total	124	23		[3.5 POINTS]

#22.

Source	SS	df	MS	
Between Treatments	72	3	24	
Within Treatments	108	36	3	$F(3,39) = 8.00$
Total	180	39		[3.5 POINTS]

Chapter 14

#8. The null hypothesis states that there are no differences among the three treatments

$$H_0 = \mu_1 = \mu_2 = \mu_3$$

With $df = 2, 6$ the critical value is 5.14

Source	SS	df	MS	
Between Treatments	8	2	4	
Within Treatments	94	9		$F(2,6) = 6.00$
Between Subjects	90	3		
Error	4	6	.67	
Total	102	11		$F_{critical} = 5.14$

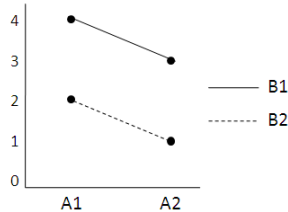
Reject H_0 ; there is a significant difference among the three treatments.

[4 POINTS]

#20. a. 20 **[2 POINTS]**

b. 80 **[2 POINTS]**

#27. a.



[2 POINTS]

b. The lines are parallel, so there does not appear to be an interaction. There is likely a small main effect for A and a larger main effect for B. **[2 POINTS]**

c. The null hypotheses state there is no difference between levels of factor A ($\mu_{A1} = \mu_{A2}$), no difference between levels of factor B ($\mu_{B1} = \mu_{B2}$), and no interaction. All F 's have $df = 1, 36$ and $F_{critical} = 4.11$.

Source	SS	df	MS	
Between Treatments	50	3		
A	10	1	10	$F(1,36) = 2.00$
B	40	1	40	$F(1,36) = 8.00$
AxB	0	1	0	$F(1,36) = 0$
Within Treatments	180	36	5	
Total	230	39		

The main effect of Factor B is significant, but the A effect and interactions are not.

[3 POINTS]