

Psy 420 – Midterm 1
Part 1 – In class (50 points total)**True or False (circle T or F) (1 point each)**

1. T F With more than 2-groups, performing multiple T-tests would be the same as doing a one-way ANOVA.
2. T F In a one-way ANOVA, total variance is the sum of within and between groups variance.
3. T F In ANOVA, your sample must have a normal distribution?

Multiple Choice (circle the best answer) (1 points each)

4. If an IV has no effect on subject scores you would expect the F-ratio for that effect in an ANOVA to be:
A) 0 B) 1
C) 1.96 D) cannot be determined
5. An effect you're studying has a Cohen's D of .5. According to Cohen, the size of this effect is:
A) Large B) Moderate
C) Small D) not worth studying
6. IV A and IV B interact significantly, what does this mean?
A) A causes B B) A and B have the same effect on the DV
C) The effect of A depends on B D) Subjects in A got to know subjects in B
7. If you have a 2 x 2 x 2 ANOVA, this means that:
A) You have 2 IVs with 3 levels each B) You have 2 IVs and 3 DVs
C) You have 3 IVs with 2 levels each D) You have 3 IVs and 2 subjects in each IV
8. $\sum Y_i - Y_{GM}^2$ is the deviation form of:
A) SS_T B) SS_{BG}
C) SS_{WG} D) MS_{WG}

Fill in the blank and short-answer

9. According to the simplest form of the GLM, a subject's score is said to be the sum of _____, _____ and _____. (3 points)
10. In regression terms, the residual is the difference between _____ and _____. (2 points)
11. When performing an ANOVA, why do we assume homogeneity of variance? (2 points)
12. Describe 1 scenario where the assumption of independence of errors would be violated. (2 points)

13. Under what circumstance is trend analysis recommended? (2 points)
14. You have an IV with four groups (groups 1, 2, 3 and 4) and there is a significant quadratic trend; what might your data look like (draw a graph) (2 points)?
15. If you have a three-way ANOVA (IVs A, B and C), the between groups sums of squares is broken down into what effects (just list the labels of the effects, not the formulas)? (1 point each)

One-Way ANOVA

	Square	BNL	DMB	John Mayer	
	9	7	5	3	
	10	5	6	4	
	9	7	3	4	
	8	8	3	4	
	8	6	5	5	
Sum	44	33	22	20	T = 119
Mean	8.8	6.6	4.4	4	$\sum Y^2 = 799$
SD	0.84	1.14	1.34	0.71	

20 subjects were randomly selected to rate 4 different recording artists (Square, Bare Naked Ladies, Dave Mathews Band and John Mayer) on a ten point scale (higher scores mean they liked the artist more).

16. Do an omnibus ANOVA (show your work) and decide if there is a significant difference between groups (5 points):

Source	SS	df	MS	F

17. Test for the homogeneity of variance assumption (2 points).

18. Calculate η^2 for the effect (2 points):

19. Do a single test comparing Square to all the other artists combined and test the comparison using a Scheffé adjustment (3 points):

3-way ANOVA

	c ₁			c ₂			c ₃			
	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	
b ₁	6	7	6	6	6	6	7	6	7	A ₁ = 173 A ₂ = 205 A ₃ = 235 B ₁ = 174 B ₂ = 194 B ₃ = 245 C ₁ = 227 C ₂ = 206 C ₃ = 180
	6	6	7	7	6	7	7	6	7	
	6	7	7	7	6	6	7	6	6	
b ₂	6	7	10	6	7	6	6	6	7	T = 613 ΣY ² = 5069
	7	9	11	6	6	7	7	6	6	
	6	8	12	6	7	7	7	7	8	
b ₃	7	11	14	6	11	13	6	7	7	
	6	11	13	6	10	15	7	7	6	
	6	11	14	6	10	14	7	8	6	

A x B x C cell totals

	c ₁			c ₂			c ₃		
	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃
b ₁	18	20	20	20	18	19	21	18	20
b ₂	19	24	33	18	20	20	20	19	21
b ₃	19	33	41	18	31	42	20	22	19

2-way interaction totals

	a ₁	a ₂	a ₃		a ₁	a ₂	a ₃		c ₁	c ₂	c ₃
b ₁	59	56	59	c ₁	56	77	94	b ₁	58	57	59
b ₂	57	63	74	c ₂	56	69	81	b ₂	76	58	60
b ₃	57	86	102	c ₃	61	59	60	b ₃	93	91	61

20. Based on the data above, fill in the missing pieces of the source table on the next page (6 points). Use the space below for any calculations you need, make sure you show all work.

Source Table

Source	SS	df	MS	F
A	71.21	2	35.61	103.00
B	99.28	2	49.64	143.61
C	41.06	2	20.53	59.39
AB	61.61	4	15.40	44.55
AC				
BC	52.20	4	13.05	37.75
ABC	41.58	8	5.20	15.04
S/ABC		54	.35	
Total	430.11	80		

21. Calculate partial Omega squared for the AB effect (3 points):

22. If you were to do this ANOVA through regression how many predictors (Xs) would you need to code the ABC interaction? (1 point)