

Exam 2

Instructions:

To complete this exam, you may either 1) complete your answers in a typed document and upload the file to “Exam 2” in Blackboard; OR 2) complete your answers with paper and pencil/pen, take pictures of your answers, and upload your picture files to “Exam 2” in Blackboard.

Read each question **carefully**. **Points will be deducted for careless mistakes**. You may use any notes, books, etc. that you choose but your research question must be your own. If I see that classmates have the same research question, you will receive an automatic zero on this exam. There are a total of **4** questions, and each question has sub-questions. To receive full credit, all of the sub-questions need to be completed.

Some things to remember:

- This exam includes more writing and logic/argument skills in addition to the computational components.
- If you need to use an equation, **WRITE OUT THE EQUATION**. Please do not make me guess which equation you are using.
- **SHOW ALL YOUR WORK**. Make sure I can clearly identify your final answer (e.g. bold or circle your final answer).
- Round to the 4th decimal place until you are done with all calculations. Your final answer should be rounded to the 2nd decimal place.
- For some examples, I will do some of these preliminary calculations for you. Do not redo the work if I give it to you.

Good luck!

Question A. The below data correspond to an **independent-measures t test**.

1. Provide a hypothetical research question that is appropriate for an independent-measures t test.
2. Identify the independent and dependent variables of your research design, including the levels of the independent variable.
3. Describe what alpha is, and what the alpha level's relationship is to the null hypothesis in the specific context of your research study.
4. Using the following data below, determine whether the data are sufficient to conclude that there was a significant difference between your two conditions. Use an $\alpha = .05$, two-tailed. **Show all of your work, including all of the steps in your hypothesis test.**
5. Compute the value of Cohen's d for these data, and specifically describe what it is measuring.
6. Write a short paragraph describing the findings of the hypothesis test.

Condition 1	Condition 2
10	7
8	4
7	9
9	3
13	7
7	6
6	10
12	2
$n_1 = 8$	$n_2 = 8$
$M_1 = 9$	$M_2 = 6$
$s_1^2 = 6.29$	$s_2^2 = 8.00$

Question B. The below data correspond to a **repeated-measures t test**.

1. Provide a hypothetical research question that is appropriate for a repeated-measures t test.
2. Identify the independent and dependent variables of your research design, including the levels of the independent variable.
3. Describe what a Type I and Type II error would look like for your proposed research study.
4. List one advantage and one disadvantage of using a repeated-measures t-test.
5. Using the following data below, determine whether the data are sufficient to conclude that there was a significant difference between your two conditions. Use an $\alpha = .05$, two-tailed. **Show all of your work, including all of the steps in your hypothesis test.**
6. Write a short paragraph describing the findings of the hypothesis test.

Participant	Condition 1	Condition 2	D (Condition 2 – Condition 1)
A	7	8	1
B	2	9	7
C	4	6	2
D	5	7	2
E	5	6	1
F	3	8	5
$n_D = 6$	$M_D = 3$	$s_D^2 = 6$	

Question C. The below data correspond to an **independent-measures ANOVA**.

1. Provide a hypothetical research question that is appropriate for an independent-measures ANOVA.
2. Identify the independent and dependent variables of your research design, including the levels of the independent variable.
3. Describe what the between-treatments variance and within-treatments variance are specifically with regards to your research study.
4. Using the following data below, determine whether the data are sufficient to conclude that there was a significant difference between your conditions. Use an $\alpha = .05$. **Show all of your work, including all of the steps in your hypothesis test.**
5. If your data are significant, compute a post hoc analysis using Tukey's HSD test. If your data are not significant, write "N/A – not significant" for this question.
6. Write a short paragraph demonstrating how the outcome of the hypothesis test would appear in a research report.

I	II	III	
5	2	7	N = 24
1	6	3	G = 72
2	2	2	$\Sigma X^2 = 292$
3	3	4	
0	5	5	
1	3	2	
2	0	4	
2	3	5	
n = 8	n = 8	n = 8	
M = 2	M = 3	M = 4	
T = 16	T = 24	T = 32	
SS = 16	SS = 24	SS = 20	

Question D. The below data correspond to a **repeated-measures ANOVA**.

1. Provide a hypothetical research question that is appropriate for a repeated-measures ANOVA.
2. Identify the independent and dependent variables of your research design, including the levels of the independent variable.
3. Why is the computation for the repeated measures ANOVA different than the independent-measures ANOVA? What specifically are we excluding? Relate this answer to your specific research study.
4. Using the following data below, determine whether the data are sufficient to conclude that there was a significant difference between your conditions. Use an $\alpha = .05$. **Show all of your work, including all of the steps in your hypothesis test.**
5. If your data are significant, compute a post hoc analysis using Tukey's HSD test. If your data are not significant, write "N/A – not significant" for this question.
6. Write a short paragraph demonstrating how the outcome of the hypothesis test would appear in a research report.

Participant	I	II	III	P	
A	0	1	2	3	N = 15 G = 60 $\Sigma X^2 = 354$ $SS_{\text{Between Subjects}} = 54$
B	2	5	5	12	
C	1	2	6	9	
D	5	4	9	18	
E	2	8	8	18	
	n = 5	n = 5	n = 5		
	M = 2	M = 4	M = 6		
	T = 10	T = 20	T = 30		
	SS = 14	SS = 30	SS = 30		