60080079 Introduction to Statistical Methods
Semester 2 2023-2024
Homework Assignment 11

21 CST H3Art

1. To account for the fact that we are testing three planned contrasts, we can use the ___ method. This will make the p-values ___ as large as the original p-values.
1) Scheffé
2) Bonferonni
3) thrice
4) twice

Write your answer as a two-digit number.

Note that p-values are probabilities so they are always in the interval [0, 1]. If the values are smaller than 0 or larger than 1, we set them to 0 or 1, respectively,

Answer: 23

For the remaining problems, use the following data for a 2×2 design with 4 subjects per treatment condition.

	*b*1	*b*2
*a*1	15 12 14 16	19 16 18 20
*a*2	12 9 10 8	11 7 8 7

2. We can first analyze whether or not the four groups differ. This is equivalent to asking whether all the main and interaction effects are equal to 0. For this test, the correct p-value is ___, and we can conclude that ___.
1) .000
2) .009
3) .180
4) all the effects are zero
5) all the effects are not zero
6) some effects are not zero

Write your answer as a two-digit number.

Answer: 16

3. In analyzing the main and interaction effects, we can conclude that there is ___ main effect due to Factor A, there is ___ main effect due to Factor B, and there is ___ interaction effect.
1) no
2) a

3) an

Write your answer as a three-digit number.

Answer: 213

4. Taking together the results of the tests for the main and interaction effects into account, our final model is: μ_{ijk} =

1) $\mu + \alpha_i$
2) $\mu + \beta_j$
3) $\mu + \alpha_i + (\alpha\beta)_{ij}$
4) $\mu + \beta_j + (\alpha\beta)_{ij}$
5) $\mu + \alpha_i + \beta_j + (\alpha\beta)_{ij}$

Write your answer as a single-digit number.

Answer: 3

A 2×2 design produces four different groups or combinations (i.e., (1,1), (1,2), (2,1), (2,2)). We can create a new variable $g = 10 \times a + b$ to denote the four groups (i.e., 11, 12, 21, 22).

In SPSS, we can create a new variable using **Transform à Compute Variable**.

In the **Compute Variable** dialog box, type the new variable name in the **Target Variable** box (e.g., **g**), and formula in the **Numeric Expression** box (i.e., **10*A+B**).

Finally, click OK.

5. Use a one-way ANOVA to analyze the same data using *g* as the grouping variable. The p-value of the test is equal to ___.

1) .000
2) .009
3) .180

Write your answer as a single-digit number.

Answer: 1

Consider the following contrast coefficients:

Contrast 1	1	1	-1	-1
Contrast 2	1	-1	1	-1
Contrast 3	1	-1	-1	1

6. The computed *t*-statistics for Contrasts 1, 2, and 3 are ___, ___, and ___, respectively.

1) -1.424

2) -3.132
3) 8.258

Write your answer as a three-digit number.

Answer: 312

7. The p-values for Contrasts 1, 2, and 3 are ___, ___, and ___, respectively.
1) .000
2) .009
3) .180

Write your answer as a three-digit number.

Answer: 132

8. This correspondence suggests that Contrasts 1, 2, and 3 are testing the ___, ___, and ___, respectively.
1) overall effect
2) main effect of Factor A
3) main effect of Factor B
4) interaction effect

Write your answer as a three-digit number.

Answer: 234