OEB University Department of English

1st EXAM IN STATISTICS Answers Key

Exercise 1 (5 pts): Determine whether the following statements are true (T) or false (F) and correct the false statements.

N°	Statements	T/F
1	Non-parametric tests rank data instead of using raw values, increasing outliers' effects and managing irregular distributions.	F
	Non-parametric tests rank data instead of using raw values, <u>reducing</u> outlier effects and managing irregular distributions.	1
2	Parametric tests typically exhibit greater power when their underlying assumptions, such as normality, are met. Under these conditions, parametric tests are usually <u>less</u> efficient at detecting genuine effects compared to nonparametric tests.	F
	Parametric tests typically exhibit greater power when their underlying assumptions, such as normality, are met. Under these conditions, parametric tests are usually <u>more</u> efficient at detecting genuine effects compared to nonparametric tests.	1
3	Mann-Whitney U test is ideal for comparing two <u>dependent</u> groups when data is <u>categorical</u> , continuous, skewed, or violates normality and equal variance assumptions.	F
	Mann-Whitney U test is ideal for comparing two <u>independent</u> groups when data is <u>ordinal</u> , continuous, skewed, or violates normality and equal variance assumptions.	1
4	Non-parametric tests frequently rely on the median as a measure of central tendency because they are designed for data that may violate normality assumptions or include outliers. The median is more robust in such cases, providing a reliable summary of the data's center.	Т
		1
5	The reliability of ANOVA depends on several key assumptions about the data. When these assumptions are satisfied, ANOVA effectively compares group means and yields meaningful results. However, if the assumptions are violated, the test outcomes may be unreliable or misleading.	Т
		1

Exercise 2 (4 pts): Briefly explain the following concepts:

1. **Median** : The median is the middle value in a dataset when the numbers are arranged in ascending order. If there is an even number of data points, the median is the average of the two middle values.

2. The difference between the independent t-test and Mann-Whitney U : Mann-Whitney U is a robust alternative to the independent t-test, particularly when the data is skewed; sample sizes are small; and/or assumptions of normality and equal variances are not met.

OEB University Department of English	Duration : 1h 30min Master 2 Level	19.01.2025 Teacher: L. Benhamlaoui		
Exercise 3 (5 pts): Indicate what test is most suitable for the following research questions.				
RQ1 : Do Algerian EFL students show significant improvement in their vocabulary test scores after				
participating in a four-week intensive English workshop? 1				
a- <u>Dependent <i>t</i>-test</u>	C-	Wilcoxon signed-rank test		
b- Chi-square for goodness of fit	d-	Chi-square homogeneity test		
RQ2: Are there significant differences in text classification accuracy when processing Algerian				
Arabic data using three different machine learning models? 1				
a- <u>ANOVA</u>	C-	Kruskal- Wallis test		
b- Chi-square test of independence	d-	Pearson's coefficient of correlation		
RQ3 : Are there significant differences in perceived academic stress levels between Algerian university students living in dormitories and those commuting from home? 1				
a- Regression	C-	Brown and Smythe's test		
b- Mann-Whitney U test	d-	t-test		
RQ4: Do students from various cultural backgrounds – Asian, European, and Middle Eastern –differ significantly in their speaking proficiency test in a multicultural TEFL classroom? 1a- ANOVAb- Mann-Whitney U testc- Chi-square for goodness of fit testd- t-test				
RQ5 : Is there a difference in Algerian bilingual (Arabic-French) and monolingual (Arabic-only) learners' perceived level of difficulty with English grammar? 1				
a- ANOVA	с-	Chi-square for goodness of fit test		
b- Mann-Whitney U test	d-	<i>t</i> -test		
Exercise 4 (6pts): Analyse each scenario carefully and identify the error (s) (circle the letter				

corresponding to your answer)

Scenario 1 : Two groups of Algerian students are taught grammar using different methods: Group A receives explicit instruction, and Group B receives implicit instruction. The researcher uses an independent t-test to assess the efficacy of the two instructions by comparing the student's opinion collected in semi-structured interviews.

- a. Inappropriate test selection.
- b. The collected data is unsuitable for ttest.

Scenario 2 : A study compares speaking confidence between Algerian EFL students in private and public schools. A standardized test was used to measure students' performance among 80 students (40 per group). Mann-Whitney U test was used to analyze differences between the two groups. The investigation aims to highlight how school environments impact students' confidence in speaking English in Algeria.

a. The collected data is unsuitable for the test.

- c. The participants do not belong to the same group.
- b. Sample size too large for the test
- c. Inappropriate test selection.

Scenario 3 : A researcher investigates gender differences in perceptions of politeness strategies in Algerian discourse. 50 male and 50 female participants rated the politeness of conversational excerpts on a 5-point Likert scale (1 = not polite at all, 5 = very polite). Excerpts were selected from authentic interactions and validated for representativeness. Ratings were compared using ANOVA to identify significant differences between genders. The study aims to explore how gender influences sociolinguistic evaluations in the Algerian context.

- a. Inappropriate test selection.
- b. The collected data is unsuitable for the test.
- c. The research objective doesn't match with the procedure.