

1st EXAM IN STATISTICS_Answers Key

Exercise 1 (10 pts): Indicate what test is most suitable for the following research questions.

RQ1: Is there a significant association between teaching methods (traditional vs. modern) and student engagement levels in Algerian primary schools? **(1)**

- a- ANOVA
- b- Chi-square test of independence**
- c- Kruskal- Wallis test
- d- Pearson's coefficient of correlation

RQ2: Do individuals from different socio-economic backgrounds exhibit significant variations in their use of language registers in formal and informal settings? **(1)**

- a- Regression
- b- Mann-Whitney U test
- c- Brown and Smythe's test
- d- t-test**

RQ3: Do individuals with varying levels of working memory capacity show significant differences in their ability to process syntactically complex sentences? **(1)**

- a- ANOVA**
- b- Mann-Whitney U test
- c- Chi-square for goodness of fit test
- d- t-test

RQ4: What is the relationship between the level of complexity of texts translated using AI and the improvement in students' translation skills? **(1)**

- a- Mann-Whitney U test
- b- Kruskal-Wallis test
- c- Chi-square test of independence
- d- Regression**

RQ5: Is there a significant connection between the implementation of inclusive education practices and the social integration of students with diverse learning needs in Algerian educational settings? **(1)**

- a- ANOVA
- b- t-test
- c- Kruskal- Wallis test
- d- Chi-square test of independence**

RQ6: Does the observed frequency of grammatical errors in spontaneous speech deviate significantly from the expected frequency based on linguistic norms? **(1)**

- a- Brown and Smythe's test
- b- Chi-square test of independence
- c- Chi-square for goodness of fit test**
- d- Pearson's coefficient of correlation

RQ7: Is there a significant difference in language attitudes and preferences between speakers of different genders within a specific cultural context? **(1)**

- a- ANOVA
- b- Kruskal- Wallis test
- c- Brown and Smythe's test
- d- t-test**

RQ8: Are there significant differences in the neural activation patterns associated with semantic processing among speakers of different languages during a language comprehension task? **(1)**

- a- ANOVA**
- b- Mann-Whitney U test
- c- Chi-square for goodness of fit test
- d- t-test

RQ9: Does the distribution of errors in a sentence recall task differ significantly from what would be expected by chance, considering the influence of working memory constraints? **(1)**

- a- Wilcoxon signed-rank test
- b- Regression
- c- Chi-square for goodness of fit test**
- d- Pearson's coefficient of correlation

RQ10: Does the integration of AI translation tools into language teaching curricula predict changes in students' language proficiency over time? **(1)**

- a- t-test
- b- Regression**
- c- ANOVA
- d- Brown and Smythe's test

Exercise 2 (4 pts): Analyse the table below and answer the following questions. (Circle the letter corresponding to your answer.)

Heading: Tests of Normality

Group	Test	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Experimental group	Pre	.137	24	.200	.956	24	.362
	Post	.148	24	.189	.938	24	.150
Control group	Pre	.275	24	.000	.821	24	.001
	Post	.121	24	.200	.962	24	.477

- What is the heading of the table? **(1)**
- For which statistical test (s) the table could have been generated?**(1)**
 - t-test**
 - Mann-Whitney U**
 - ANOVA**
 - Chi-square for goodness of fit
 - None of the them
 - All of them
- According to the Sig values, which test(s) can you run? **(1)**
 - t-test**
 - Mann-Whitney U
 - ANOVA**
 - Chi-square for goodness of fit
 - None of the them
 - All of them
- Which set(s) of data deviate from normality? **(1)**
 - Pre-test experimental group
 - Pre-test control group**
 - Post-test experimental group
 - Post-test control group

Exercise 03 (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.

- Inappropriate test selection.
- The collected data is unsuitable for t-test.**
- The participants do not belong to the same group.

Scenario 2 : A study uses a dependent t-test to examine the relationship between gender (male/female) and the frequency of French loanword usage in urban Algeria.

- Incorrect test applied for categorical data.**
- Gender and loanword usage are unrelated
- Sample size too large for the test

Scenario 3 : A researcher uses ANOVA to investigate whether the distribution of Arabic, French, and Tamazight usage in Algerian workplaces matches national census data. Language usage is recorded as percentages.

- Data must be categorical.**
- Census data unsuitable for comparison
- Observed frequencies are invalid
- Inappropriate Test selection.**

Scenario 4 : A study evaluates students' comprehension scores after teacher-led and AI-assisted sessions. The researcher selects randomly two groups as experimental and control groups and uses a dependent t-test.

- Inappropriate test selection.
- Comprehension scores are unsuitable for t-tests
- Sample selection**