UNIVERSITY OF BISKRA   DEPARTMENT OF ENGLISH   M2 - STATISTICS   EXAM

FULL NAME:_____   **DATE:** January 6th, 2026   _____

GROUP NUMBER:_____   **TIME:** 2 hours   **20**

ACTIVITY ONE (6 points)

- Tick (✓) the correct answer:

 # The role of descriptive statistics is:
○ Calculating the probability value alpha
○ Calculating the effect size
○ Summarizing the data of a sample **(1 pts)**
○ Making predictions about a sample

 # Which of the following variables cannot be validly analyzed using a mean?
○ IELTS score
○ Gender **(1 pts)**
○ Reaction time in milliseconds
○ Number of pronunciation errors

 # In the dataset (21, 15 ,4, 24, 7, 23, 24, 7), the median is:
○ 7
○ 24
○ 7 and 24
○ 18 **(1 pts)**

 # If σ^2 is 1.35, the population standard deviation is:
○ 0.67
○ 1.16 **(1 pts)**
○ 1.82
○ 2.70

 # A Type II error occurs when a researcher:

○ Rejects a true null hypothesis
○ Accepts a true null hypothesis
○ Rejects a false null hypothesis
○ Accepts a false null hypothesis **(1 pts)**

 # Which situation requires a non-parametric test?

○ Ratio data with random sampling
○ Ordinal data with non-normal distribution **(1 pts)**
○ Interval data with homogeneous variances
○ Large sample size (n > 100)

ACTIVITY TWO (6 points)

- Complete the table with the corresponding **data type** and the appropriate **test** for each scenario:

	Data type	Shapiro–Wilk (p)	Levene's Test (p)	Inferential test
Students' motivation levels (Very low → Very high) collected from three intact classes selected randomly.	Ordinal data **(1 pts)**	.012	.410	Kruskal–Wallis test **(1 pts)**
Years of English exposure are correlated with listening scores of a stratified random sample of university students.	Ratio data **(1 pts)**	.021	.480	Spearman's rank-order correlation **(1 pts)**
Pronunciation accuracy scores collected before and after training from the same randomly selected learners.	Ratio data **(1 pts)**	.680	.051	Paired-samples t-test **(1 pts)**

ACTIVITY THREE (8 points)

- Use the table and formula below to **calculate** and **interpret** the effect size d:

	n	Mean	Standard Deviation
Group 1	5	35.20	14.02
Group 2	5	37.40	12.58

Cohen's d:

$$d = \frac{\bar{x}_1 - \bar{x}_2}{SD_{Pooled}}$$

Where:

$$SD_{Pooled} = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{n_1 + n_2 - 2}}$$

Report full calculations:

Step 1: Calculate the pooled standard deviation
Square the standard deviations **(1 pts)**
SD1² = 14.02² = 196.56
SD2² = 12.58² = 158.26

Multiply by degrees of freedom **(1 pts)**
(5 − 1) × 196.56 = 4 × 196.56 = 786.24
(5 − 1) × 158.26 = 4 × 158.26 = 633.04

Sum and divide **(2 pts)**

$$= \frac{(786.24 + 633.04)}{(5 + 5 - 2)}$$

$$= \frac{1419.28}{8}$$

= 177.41

Take the square root **(1 pts)**
$SD\_pooled = \sqrt{177.41} \approx 13.32$

Step 2: Calculate Cohen's d **(2 pts)**

$$d = \frac{(35.20 - 37.40)}{13.32}$$

$$d = \frac{-2.20}{13.32}$$

$d \approx -0.17$

Interpretation (1 pts)
Based on the *d* value, the effects size is: <mark>Small/ Negligible</mark>

BEST OF LUCK!