AFRICA UNIVERSITY
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"Investing in Africa's Future"

COLLEGE OF SOCIAL SCIENCES, THEOLOGY, HUMANITIES AND EDUCATION

HPS148 STATISTICS IN PSYCHOLOGY

END OF SECOND SEMESTER EXAMINATIONS

APRIL/MAY 2018

LECTURER: MRS C. MADZIWA

DURATION: 3 HRS

INSTRUCTIONS

1. Do NOT write your name on the answer sheet.
2. Use answer sheets provides.
3. Answer ALL questions.
4. Begin your answer for each question on a new page.
5. Credit is given for neat, well-written and lucid work.

Answer all questions

Question 1

Define the following terms

i)	Population	(1 mark)
ii)	Statistic	(1 mark)
iii)	Ordinal scale	(1 mark)
iv)	Positive skew	(1 mark)
v)	Bimodal distribution	(1 mark)
vi)	Variance	(1 mark)
vii)	T test	(1 mark)
viii)	Bar graph	(1 mark)
ix)	Variable	(1 mark)
x)	Descriptive statistics	(1 mark)

Question 2

The following table represents end of term marks for English for 10 Grade 4 pupils streamed according to ability:

Grade 4 Yellow	Grade 4 Blue	Grade 4 Purple	Grade 4 Pink
47	29	27	15
37	32	21	20
34	30	25	24
43	28	28	17
43	33	26	18
34	28	24	15
36	31	26	16
38	30	21	16
35	32	28	18
39	30	27	14

Calculate the mean, range, variance and standard deviation for each group (12 marks).

Question 3

The following data gives the amount of money earned per week by 50 informal traders at a main bus terminus in Harare:

69	48	49	64	48	52	57	62	60	66
53	50	63	61	73	77	62	69	61	56
73	56	71	76	70	70	69	50	55	61
54	71	56	97	62	59	47	69	61	54
90	72	58	45	55	61	46	69	63	73

Construct a histogram and frequency polygon curve for the data (8 marks)

Question 4

The following data represent reading scores obtained by 10 students before and after remedial lessons. Establish whether there is a correlation before and after:

Marks before	20	25	20	25	22	24	21	20	23
Marks after	30	32	28	31	29	30	29	26	30

Question 5

Susan carried out a study to establish the effect of reward on performance over two months. A reading test was given before the purposive reward and after. Calculate the appropriate *t*- test at 0.05 significance level to establish whether there is a difference. (10 marks)

Reading before reward	Reading after reward
28	33
26	40
24	35
25	31
26	32
26	30
27	35
17	34
16	33
15	32

Question 6

Chris conducted a study to see if there is a difference in helping behaviour under two conditions. A where there are fewer people and B where there are many people. The table below shows the figures. Find whether there is a significant difference by calculating chi-square at 0.05 significance level (10 marks)

	Condition A	Condition B	TOTAL
Help	75	45	120
Did not help	40	80	120
Total	115	125	240

FORMULA

Variance $s^2 = \frac{\Sigma X^2}{N} - (\bar{X})^2$

Standard deviation $s = \sqrt{\frac{\Sigma X^2}{N} - (\bar{X})^2}$

Spearman rho $r = \left| -\frac{6\Sigma D^2}{N(N^2-1)} \right|$

Pearson $r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{(N\Sigma X^2 - (\Sigma X)^2)(N\Sigma Y^2 - (\Sigma Y)^2}}$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\Sigma D^2 - \frac{(\Sigma D)^2}{N_{pairs}}}{N_{pairs}(N_{pairs}-1)}}}$$

$df = N_{pairs} - 1$

THE USE OF TABLE C

For any given df, Table C shows the values of t corresponding to various levels of probability. Obtained t is significant at a given level if it is equal to or *greater than* the value shown in the table.

TABLE C
Critical values of t

	Level of significance for one-tailed test					
	0.10	0.05	0.025	0.01	0.005	0.0005
	Level of significance for two-tailed test					
df	0.20	0.10	0.05	0.02	0.01	0.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291

Table C is taken from Table III (page 46) of Fisher and Yates, *Statistical Tables for Biological, Agricultural, and Medical Research*, 6th ed., published by Longman Group Ltd., 1974. London (previously published by Oliver and Boyd, Edinburgh), and by permission of the authors and publishers.