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(*UNIVERSITY OF CHOICE*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATIONS

MAIN EXAM

FOR THE DOCTOR OF PHILOSOPHY DEGREE

(EDUCATIONAL PSYCHOLOGY)

COURSE CODE: PSY 904

COURSE TITLE: ADVANCED EDUCATIONAL STATISTICS

DATE: 27/04/2022 TIME: 9:00 AM – 12:00 PM

INSTRUCTIONS TO CANDIDATES

ANSWER 4 QUESTIONS
QUESTION ONE (1) IS COMPULSORY
ANSWER THREE OTHER (3) QUESTIONS

TIME: 3 HOURS

MMUST observes ZERO tolerance to examination cheating

1a) Distinguish between the following: (6mks)

i) Primary data and secondary data
ii) Population and sample
iii) Descriptive and inferential statistics

b) Explain the difference between Parametric and Nonparametric test. (9mks)

2. Below find the salaries in millions per year of people who have a degree in economics, medicine and history. Perform a single factor ANOVA Is there a significant difference between means o the salaries of the three groups

H_0: $\mu_1 = \mu_2 = \mu_3$

H_1: at least one of the means is different. (15mks)

NO	ECONOMICS	MEDICINE	HISTORY
1	42	69	35
2	53	54	40
3	49	58	53
4	53	64	42
5	43	64	50
6	44	55	39
7	45	56	55
8	52		39
9	54		40

3) We look at a study of males versus females mean (**Scholastic Assessment Test**) SAT scores. The mean SAT score for females is 1180 with a standard deviation of 5 and for males, the mean SAT score is 1160 with a standard deviation of 6.

a) What is the standard error for the mean SAT score for females, for males, for the difference between the two? (7mks)

b) Form a 95% confidence interval for the mean SAT score for females. (4mks)

c) Form a 95% confidence interval for the difference in mean SAT scores between males and females. (4mks)

4. Suppose the IQ score have a bell shaped distribution with a mean of 100 and the standard deviation of 15.

i) What proportion of people should have an IQ score between 85 and 115(3mks)
ii) What proportion of people should have an IQ score between 70 and 130(3mks)
iii) What proportion should have an IQ of more than 130(3mks)
iv) A person with an IQ greater than 145 is considered a genius. Does the empirical rule support this statement? Explain.(5mks)

(15mks)

5. A sample was given on number of correct answers and students' attitude to taking a test

Student no	**Correct answers**	**Attitude**
1	17	94
2	13	73
3	12	59
4	15	80
5	16	93
6	14	85
7	16	66
8	16	79
9	18	77
10	19	91

(i) Identify the dependent variable *and* the independent variable. (3mks)

(ii) Determine the regression equation. Interpret the regression coefficients of the sample. (12mks)

THE CRITICAL TABLES

Table of the chi square distribution { Appendix J, p. 915

Level of Significance ®

df	0.200	0.100	0.075	0.050	0.025	0.010	0.005	0.001	0.0005
1	1.642	2.706	3.170	3.841	5.024	6.635	7.879	10.828	12.116
2	3.219	4.605	5.181	5.991	7.378	9.210	10.597	13.816	15.202
3	4.642	6.251	6.905	7.815	9.348	11.345	12.838	16.266	17.731
4	5.989	7.779	8.496	9.488	11.143	13.277	14.860	18.467	19.998
5	7.289	9.236	10.008	11.070	12.833	15.086	16.750	20.516	22.106
6	8.558	10.645	11.466	12.592	14.449	16.812	18.548	22.458	24.104
7	9.803	12.017	12.883	14.067	16.013	18.475	20.278	24.322	26.019
8	11.030	13.362	14.270	15.507	17.535	20.090	21.955	26.125	27.869
9	12.242	14.684	15.631	16.919	19.023	21.666	23.589	27.878	29.667
10	13.442	15.987	16.971	18.307	20.483	23.209	25.188	29.589	31.421
11	14.631	17.275	18.294	19.675	21.920	24.725	26.757	31.265	33.138
12	15.812	18.549	19.602	21.026	23.337	26.217	28.300	32.910	34.822
13	16.985	19.812	20.897	22.362	24.736	27.688	29.820	34.529	36.479
14	18.151	21.064	22.180	23.685	26.119	29.141	31.319	36.124	38.111
15	19.311	22.307	23.452	24.996	27.488	30.578	32.801	37.698	39.720
16	20.465	23.542	24.716	26.296	28.845	32.000	34.267	39.253	41.309

T-Distribution Critical Value Table

α (1 tail)	0.05	0.025	0.01	0.005	0.0025	0.001	0.0005
α (2 tail)	0.1	0.05	0.02	0.01	0.005	0.002	0.001
df							
1	6.3138	12.7065	31.8193	63.6551	127.3447	318.4930	636.0450
2	2.9200	4.3026	6.9646	9.9247	14.0887	22.3276	31.5989
3	2.3534	3.1824	4.5407	5.8408	7.4534	10.2145	12.9242
4	2.1319	2.7764	3.7470	4.6041	5.5976	7.1732	8.6103
5	2.0150	2.5706	3.3650	4.0322	4.7734	5.8934	6.8688
6	1.9432	2.4469	3.1426	3.7074	4.3168	5.2076	5.9589
7	1.8946	2.3646	2.9980	3.4995	4.0294	4.7852	5.4079
8	1.8595	2.3060	2.8965	3.3554	3.8325	4.5008	5.0414
9	1.8331	2.2621	2.8214	3.2498	3.6896	4.2969	4.7809
10	1.8124	2.2282	2.7638	3.1693	3.5814	4.1437	4.5869
11	1.7959	2.2010	2.7181	3.1058	3.4966	4.0247	4.4369
12	1.7823	2.1788	2.6810	3.0545	3.4284	3.9296	4.3178

13	1.7709	2.1604	2.6503	3.0123	3.3725	3.8520	4.2208
14	1.7613	2.1448	2.6245	2.9768	3.3257	3.7874	4.1404
15	1.7530	2.1314	2.6025	2.9467	3.2860	3.7328	4.0728
16	1.7459	2.1199	2.5835	2.9208	3.2520	3.6861	4.0150
17	1.7396	2.1098	2.5669	2.8983	3.2224	3.6458	3.9651
18	1.7341	2.1009	2.5524	2.8784	3.1966	3.6105	3.9216
19	1.7291	2.0930	2.5395	2.8609	3.1737	3.5794	3.8834
20	1.7247	2.0860	2.5280	2.8454	3.1534	3.5518	3.8495

PPMC Critical Values

Pearson Product-Moment Correlation (PPMC) Coefficient Table of Critical Values

df = n – 2	Level of significance for two-tailed test			
n = # of pairs of data	.10	.05	.02	.01
1	.988	.997	.9995	.9999
2	.900	.950	.980	.990
3	.805	.878	.934	.959
4	.729	.811	.882	.917
5	.669	.754	.833	.874
6	.622	.707	.789	.834
7	.582	.666	.750	.798
8	.549	.632	.716	.765
9	.521	.602	.685	.735
10	.497	.576	.658	.708
11	.476	.553	.634	.684
12	.458	.532	.612	.661
13	.441	.514	.592	.641
14	.426	.497	.574	.628
15	.412	.482	.558	.606
16	.400	.468	.542	.590
17	.389	.456	.528	.575
18	.378	.444	.516	.561
19	.369	.433	.503	.549
20	.360	.423	.492	.537
21	.352	.413	.482	.526
22	.344	.404	.472	.515
23	.337	.396	.462	.505

24	.330	.388	.453	.495
25	.323	.381	.445	.487
26	.317	.374	.437	.479
27	.311	.367	.430	.471
28	.306	.361	.423	.463
29	.301	.355	.416	.456

Standard normal curve area table

The areas under the standard normal curve corresponding to distances on the baseline between the mean and each z

(1)		(2)		(3)	
Z	Area B	Z	Area B	z	Area B
.00	.00	.50	.192	1.75	.460
.02	.008	.525	.200	1.80	.464
.04	.016	.60	.226	1.85	.468
.06	.024	.65	.242	1.90	.471
.08	.032	.675	.250	1.96	.475
.10	.040	.75	.273	2.00	.477
.12	.048	.80	.288	2.05	.480
.14	.056	.84	.300	2.10	.482
.16	.064	.90	.316	2.15	.484
.18	.071	.95	.329	2.20	.486
.20	.079	1.00	.341	2.25	.488
.22	.087	1.036	.350	2.30	.489
.24	.095	1.10	.364	2.33	.490
.26	.103	1.15	.375	2.40	.492
.28	.110	1.20	.385	2.45	.493
.30	.118	1.25	.394	2.50	.494
.32	.126	1.28	.400	2.55	.4946
.34	.133	1.35	.412	2.58	.4951
.36	.141	1.40	.419	2.65	.4960
.385	.150	1.45	.427	2.70	.4965
.40	.155	1.50	.433	2.81	.4975
.42	.163	1.55	.439	3.09	.4990
.44	.170	1.60	.445	3.30	.4995
.46	.177	1.645	.450	3.70	.4999
.48	.184	1.70	.455	4.00	.49997

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17	1.7396	2.1098	2.5669	2.8983	3.2224	3.6458	3.9651
18	1.7341	2.1009	2.5524	2.8784	3.1966	3.6105	3.9216
19	1.7291	2.0930	2.5395	2.8609	3.1737	3.5794	3.8834
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7	.582	.666	.750	.798
8	.549	.632	.716	.765
9	.521	.602	.685	.735
10	.497	.576	.658	.708
11	.476	.553	.634	.684
12	.458	.532	.612	.661
13	.441	.514	.592	.641
14	.426	.497	.574	.628
15	.412	.482	.558	.606
16	.400	.468	.542	.590
17	.389	.456	.528	.575
18	.378	.444	.516	.561
19	.369	.433	.503	.549
20	.360	.423	.492	.537
21	.352	.413	.482	.526
22	.344	.404	.472	.515

23	.337	.396	.462	.505
24	.330	.388	.453	.495
25	.323	.381	.445	.487
26	.317	.374	.437	.479
27	.311	.367	.430	.471
28	.306	.361	.423	.463
29	.301	.355	.416	.456