SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

FIRST SEMESTER EXAMINATION FOR THE BACHELOR OF ECONOMICS, BACHELOR OF ECONOMICS AND STATISTICS AND BACHELOR OF EDUCATION

XEQ 208: ECONOMIC STATISTICS III

DATE: **TIME:**

INSTRUCTIONS TO CANDIDATES

a) Answer Question ONE and any other TWO questions.
b) Begin answering a new question on a separate page on the booklet provided
c) Credit will be given to the clarity of argument and use of local examples.

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Explain four properties of point estimators (8 marks)
b) Distinguish between the following terms as used in estimation
i. Estimator and Estimate (2 marks)
ii. Null hypothesis and Alternative hypothesis (2 marks)
iii. Type I error and Type II error (2 marks)
iv. Maintained hypothesis and testable hypothesis (2 marks)
c) A Vending Machine in the student cafeteria disposes drinks into paper cups. A sample of 15 cups yields a mean of 15.3 ounces with a variance of 3.5 ounces. After adjusting the

machine, a sample of 10 cups produces an average of 17.1 ounces with a variance of 3.9 ounces. If the variance of the paper cups in the cafeteria is constant, before and after the adjustment. Construct a 95% Confidence interval for the difference in mean fills. (5 marks)

d) The manager of a company recently studied a sample of eighty employees following a letter the company received form an insurance firm offering its group health insurance to the company's 4,200 employees. As part of the study, the manager claimed that there is no difference in the average hours of sick leave taken during the past year by men versus women employees. The sample results were as follows:

Men	Women
$n_1 = 40$	$n_2 = 40$
$\bar{x}_1 = 23$	$\bar{x}_2 = 30$
$s_1^2 = 36$	$s_1^2 = 49$

Would the manger's claim hold at $\propto = 0.05$? (5 marks)

e) Suppose a sample of 100 students consisting of 50 male and 50 female students in a test reveals that an average of 65 and 70 with a standard deviation of 3 and 5 marks respectively. Is the performance difference? (4 marks)

QUESTION TWO (20 MARKS)

You are provided with the following data for Madison Furniture Company on sales (Y) and the advertising (X).

Sales (Y) ($'000')	Advertising (X) ($'000')
22	0.8
28	1.0
22	1.6
26	2.0
34	2.2
18	2.6
30	3.0
38	3.0
30	4.0
40	4.0
50	4.0
46	4.6

i. Determine the correlation coefficient between sales and advertisements and interpret your answer. (8 marks)
ii. Estimate the regression model between sales and advertising. (8 marks)
iii. Compute and interpret the coefficient of determination **(r^2)** (2 marks)
iv. How much sales would the company make by spending $5000 on advertising? (2 marks)

QUESTION THREE (20 MARKS)

a) Define the following terms
   i. Estimation (1 marks)
   ii. Hypothesis (1 marks)
   iii. Correlation (1 marks)
   iv. Regression (1 marks)
   v. Coefficient of determination (1 marks)
   vi. Coefficient of Correlation (1 marks)

b) A simple random sample of 60 items resulted in a sample mean of 80. The population standard deviation is σ 15.
   i. Compute the 95% confidence interval for the population mean. (5 marks)
   ii. Assume that the same sample mean was obtained from a sample of 120 items. Provide 95% confidence interval for the population mean. (4 marks)
   iii. What is the effect of a larger sample size on the interval estimate? (1 marks)

c) Carpetland sales persons average $8000 per week in sales. Steve Contois, the firm's vice president, proposes a compensation plan with new selling incentives. Steve hopes that the results of a trial selling period will enable him to conclude that the compensation plan increases the average sales per salesperson.

i. Develop the appropriate null and alternative hypotheses. (2 Marks)

ii. What is the Type I error in this situation? What are the consequences of making this error? (1 marks)

iii. What is the Type II error in this situation? What are the consequences of making this error? (1 marks)

QUESTION FOUR (20 MARKS)

a) An institution wants its entire staff to be computer literate. Three institutions A, B and C are available. From the past experience, 14 people who underwent training from the institutions were evaluated as follows:

A	3	4	2	4	2
B	4	5	4	6	
C	6	6	6	4	3

i. State the appropriate null and alternative hypothesis for determining whether a difference exists in the training offered. (4 marks)

ii. Construct the relevant ANOVA table and test the null hypothesis at $a = 0.05$ (16 marks)

QUESTION FIVE (20 MARKS)

a) The Kenya football federation is planning to build a sport centre. They undertook a market research study to determine the sports preference of males in various age groups. A random sample of 680 males provided the following results:

	Age Group				
		18-30	31-45	46-60	Above 61
Sport	Hockey	25	50	75	100
	Basketball	100	80	30	10
	Volleyball	5	25	25	30
	Soccer	20	30	40	35

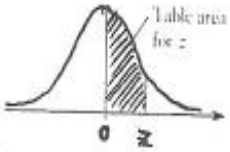
i. State the relevant null and Alternative hypothesis (4 marks)

ii. At $\alpha = 0.01$, is age related to the sports preferences? (16 marks)

XEQ 203

5

Areas of the Standard Normal Distribution



The table areas are probabilities that the standard normal random variable is between 0 and z.

	Second Decimal Place in z									
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998									
4.0	0.49997									
4.5	0.499997									
5.0	0.4999997									
6.0	0.499999999									