

THE OPEN UNIVERSITY OF SRI LANKA
 DEPARTMENT OF SOCIAL STUDIES
 BA DEGREE IN SOCIAL SCIENCES – LEVEL 5
 FINAL EXAMINATION – SEMESTER II - 2017/18
 SSE 3106/ DSE5301 - STATISTICS FOR SOCIAL SCIENCES



DURATION: THREE HOURS (03 HOURS)

Date: 10th June 2018

Time: 1.30 p.m. – 4.30 p.m.

Instructions:

- Non-programmable calculator is allowed .
- Z table is attached.
- Answer five questions selecting at least two questions from each part.

Part I

1. Explain the following concepts with an example for each
 - (a) The population and a sample
 - (b) A sample statistic and population parameter
 - (c) Discrete variables and continuous variables

2. Moore Travel, a nationwide travel agency, offers special rates on certain Srilankan tours to senior citizens. The president of Moore Travel wants additional information on the ages of those people taking tours. A random sample of 40 customers taking a tour last year revealed these ages:

77	68	63	84	68	67	65	79	59	73	76	66
65	58	56	76	58	62	56	57	62	67	66	68
63	65	69	65	61	72	66	60	65	66	84	71
63	58	61	71								

- (a) Organize the data into a frequency distribution, using 4 classes and 55 as the lower limit of the first class.
- (b) Draw a histogram.
- (c) Draw a frequency polygon.
- (d) Where do the data tend to cluster?
- (e) Describe the distribution on the ages of those people taking tours

3. (a) Interpret qualitative data using graphical techniques such as a clustered bar chart, a stacked bar chart, and a pie chart.
 (b) "In bar graphs, the bars do not touch while in histograms the bars touch." Explain with a suitable diagram for each.
4. (a) What is the difference between what a measure of central tendency tells us and what a measure of variability tells us?
 (b) Calculate and interpret the mean value and the standard deviation from the frequency distribution given below.

X	11-20	21-30	31-40	41-50
f	16	15	12	10

Part II

5. (a) Explain the characteristics of the normal distribution.
 (b) Describe the empirical rule relating to the mean and the standard deviation of a bell-shaped distribution.
 (c) For doing each problem draw a picture of what you are trying to find before you use the table to find it.
 (i) Find the area between $Z = 0$ and $Z = -1.75$.
 (ii) Find the area between $Z = +1.68$ and $Z = -1.37$.
 (iii) Find the area to the left of $Z = 1.99$.
 (iv) Find the area to the right of $Z = +1.17$ and to left of $Z = -3.01$.
6. (a) Assume that each month, a Western province household generates an average of 28 pounds of newspaper for garbage or recycling. And the standard deviation is 2 pounds. If a household is selected at random, find the probability of its generating
 (i) Between 27 and 31 pounds per month
 (ii) More than 30.2 pounds per month
- (b) The Sri Lanka Automobile Association reports that the average time it takes to respond to an emergency call is 25 minutes. Assume the variable is approximately normally distributed and the standard deviation is 4.5 minutes. If 80 calls are randomly selected, approximately how many will be responded to in less than 15 minutes?

Note: draw a suitable diagram for each answer

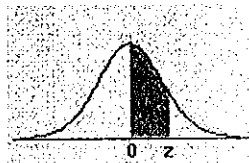
7. (a) Suppose a research firm conducted a survey to determine the average (mean) amount of money steady smokers spend on cigarettes during a week. A sample of 49 steady smokers revealed the $\bar{x} = \text{Rs. } 20$ and $S = \text{Rs. } 5$. Using the 95 degree of confidence, determine the confidence interval for μ .
- (b) Explain the following concepts with an example for each
- Null hypothesis and alternative hypothesis
 - Type I error and Type II error
 - One-Tailed and Two-Tailed Tests
 - P value and α value
8. (a) interpret the following equations
- If $P \leq \alpha$
 - If $P > \alpha$.
- (b) In the following data, calculate the test statistic, set up the rejection region, determine the p value and interpret the results.
- $H_0: \mu = 1000$
 $H_1: \mu \neq 1000$
 $\sigma = 200, n = 100, \bar{x} = 980, \alpha = .01$
9. Write short notes on four (04) of the following
- Sampling and inference
 - Nominal scale and Ratio scale
 - Point estimate and confidence Interval
 - Test statistic and standard error
 - Positively Skewed and negative Skewed distributions

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Standard Normal (Z) Table
Area between 0 and 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