Course No: DNTS 1207
Course Title: Applied Statistics
Date: /5/2013
No. of Questions: (5)
Time: 2 hours
Using Calculator (yes)

University of Palestine

Final Exam
Second term 2012/2013
Total Grade: 50 Marks

Instructor Name: Dr. Amjad El-Shanti
Student No.: _____
Student Name: _____
College Name: Faculty of Dentist and Oral Surgery
Dep./Specialist: _____
Using Dictionary (No)

Question One : (10 marks)

Put the sign (√) against the right sentences and the sign (X) against the wrong sentences:

1- A pie chart is a type of graph can be used with all types of variables. ( )
2- The median can be used with qualitative nominal variables. ( )
3- The Chi square test is used to measure the association between two quantitative variables ( ).
4- P-value is the probability that the value of the calculated test statistics occurred by chance alone ( ).
5- Central Limit Theorem states that the mean of the distribution of sample means is equal to the mean population "μ" distribution for randomly selected sample of 25 or more ( ).
6- The sample is the universe about which an investigator wishes to draw calculations ( ).
7- Constant data are observations which vary from time to time or from person to person ( ).
8- Scatter diagram is the best graph to represent the relationship between the age by years and blood pressure by mmHg ( ).
9- The normal curve is determined by variable mean and its standard deviation ( ).
10- α is the magnitude of error that one is willing to take in making the choice to reject alternative hypothesis ( ).

Question Two: (10 marks)

Select the correct answer from the following alternatives for each sentence:

1- Which of the following variable is a continuous quantitative variable:
   a) Fasting Blood Glucose level by mg/dl. b) Birth Date.
   c) Number of students in class. d) Order of children between siblings.

2- The range of the following data which represent the height of 10 persons:
   (20 – 60 – 53 – 80 – 89 – 56 – 42 – 46 – 88 – 95 cm)
   a) 56 cm c) 75 cm
   b) 52.5 cm d) 62.9 cm

3- Which of the following statement is correct about normal distribution data:
   a) $X \pm 1S$ contains about 68% of the scores. c) Normal curves are bimodal
   b) $X \pm 2S$ contains about 99% of the scores. d) Standard unit (Z) of the mean =1.

4- The mode of the following data which represent the score of achievement of eight students :
   (F – G – G – P – E – F – E – P)
   a) F, P, G, and E. c) No mode
   b) Zero d) impossible to compute mode

5- A measure of the spread of data around their mean is:
   a) Standard deviation c) Range
   b) Variance d) Semi-inter-quartile-range (S.I.Q.R)

6- A 90% confidence interval for a population mean is determined to be 800 to 900. If the confidence is increased to 95% confidence while the sample statistics and sample size remain the same, the confidence interval for μ:
   a) Becomes narrower c) Becomes wider
   b) Does not change d) Becomes 0.05

7- Assuming σ is known , which of the following would most likely result in the widest confidence interval for estimate μ:

a) Large sample size, α= 0.05
b) Small sample size, α= 0.05
c) Large sample size, α= 0.01
d) Small sample size, α= 0.01

8- Which of the following would most likely cause the confidence interval to become smaller:

a) Decreasing n
b) Increasing alpha
c) increasing mean
d) decreasing standard error

9- A researcher in the field of educational psychology is interested in the effects an open classroom has on intellectual development. In the open classroom things are much less structured than in a traditional classroom and she believes that this might affect problem-solving skills. An elementary school in her district switched to an open classroom format last year, and she is interested to see how this has impacted on the kids problem-solving skills. She obtains a random sample of 49 fourth grade children and administers a conceptual problem-solving test to them. It is known that fourth graders in traditional classes have an average score of 82 on the test. The children in this study score an average of 86 with a standard deviation of 5. Which type of statistical test should the researcher do?

a) one sample t-test
b) independent samples t-test
c) one sample z-test
d) paired sample t-test

10- According to the data in the previous question, What is the value of the correct-test statistic?

a) one sample t-test
b) independent samples t-test
c) one sample z-test
d) paired sample t-test

Question Three: (10 marks)

- The following table shows the pulse rate of eight students before and after running for a certain distance:

Student No.	Pulse Rate (beat/minute) Before Running	Pulse Rate (beat/minute) After Running
1	58	66
2	65	69
3	68	75
4	70	73
5	66	75
6	75	75
7	62	68
8	72	80

- **<u>Test if there is an effect of running on the pulse rate using 5% level of significance</u>?**

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Question Four: (10 marks)

- In a study to determine the effect of Vitamin C in developing colds, 103 children were drawn to study, 57 of them were taking vitamin C, 36 of those who took Vitamin C developed Colds, while only 35 children developed Colds from those who did not take vitamin C.
  - **Using 5% level of significance, Test whether Vitamin C has an effect on developing Colds?**

Question Five: (10 marks)

- The standard serum cholesterol for adult males is 200 mg/100ml with a standard deviation of 16.67mg/100ml. For a sample of 49 obese men, the mean reading was 225mg/100ml.

A- Construct a 95% confidence interval for μ?

B- Using 5% level of significance, Test if there is an effect of obesity on the serum cholesterol of men?

***You can use the following Formulae to answer the previous questions:**

- % of category= (Frequency of category/total frequency) X 100
- Sectoral angle= (Frequency of each category/ Total frequency)X 360
- Mid rang= (Smallest observation- Largest observation)/2
- Force X Length (x) = resistance X (total length-x)
- Median= Lower limit of median interval + (Special rank X width of median interval/observed frequency of median interval)
- $\overline{X} = \frac{\sum X_i}{n}$ Or $\overline{X} = \frac{\sum f_j X_j}{\sum f_j}$
- $S = \sqrt{\frac{\sum X_i^2 - \frac{(\sum X_i)^2}{n}}{n-1}}$ Or $S = \sqrt{\frac{\sum f_j X_j^2 - \frac{(\sum f X_j)^2}{\sum f_j}}{\sum f_j - 1}}$
- $CV = \frac{S}{\overline{X}} X100$ Or $CV = \frac{SIQR}{Q2}$
- $SIQR = \frac{Q3-Q1}{2}$
- $Z = \frac{X-\overline{X}}{S}$
- $\bar{X} - z\frac{s}{\sqrt{n}} \le \mu \le \bar{X} + z\frac{s}{\sqrt{n}}$
- C.I.= $\overline{X}$+t * (sd/√n) Or C.I.= $\overline{X}$+Z * (sd/√n)
- $t_{\bar{X}_D} = \frac{\overline{D}}{SE_{diff}}$

- $SE_{diff} = \frac{SD_D}{\sqrt{n_{pairs}}}$
- $T = \overline{X} - \mu / S_{\bar{x}}$
- $T_c = X1 - X2 / S_{\bar{x}1-\bar{x}2}$
- $S^2_{pooled} = (n_1-1)\, s_1^2 + (n_2-1)S_2^2 / (n_1+n_2-2)$
- $S_{x1-x2} = \sqrt{S^2_{pooled} * (1/n_1 + 1/n_2)}$
- $E = C_t * R_t$ /Grand total
- $X^2 = \sum [(O-E)^2 / E]$

N.B: *Answer all the obligatory and selective questions in the answer sheet.
*Table A: Areas under the normal curve table is attached to the questions' paper
* Table B: Percentage points of T distribution table is attached to the questions' paper
*Table C: The Chi-squared distribution table is attached to the questions' paper

End of Questions

Good Luck

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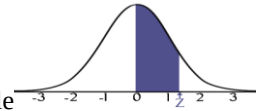
Table A: Standard Normal Distribution Table 

	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

Table B: Percentage points of T distribution table

PERCENTAGE POINTS OF THE T DISTRIBUTION

Tail Probabilities								
One Tail		0.10	0.05	0.025	0.01	0.005	0.001	0.0005
Two Tails		0.20	0.10	0.05	0.02	0.01	0.002	0.001
D	1	3.078	6.314	12.71	31.82	63.66	318.3	637
E	2	1.886	2.920	4.303	6.965	9.925	22.330	31.6
G	3	1.638	2.353	3.182	4.541	5.841	10.210	12.92
R	4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
E	5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
E	6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
S	7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
	8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
O	9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
F	10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
	11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
F	12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
R	13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
E	14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
E	15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
D	16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
O	17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
M	18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
	19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
	20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
	21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
	22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
	23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
	24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
	25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
	26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
	27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
	28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
	29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
	30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
	32	1.309	1.694	2.037	2.449	2.738	3.365	3.622
	34	1.307	1.691	2.032	2.441	2.728	3.348	3.601
	36	1.306	1.688	2.028	2.434	2.719	3.333	3.582
	38	1.304	1.686	2.024	2.429	2.712	3.319	3.566
	40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
	42	1.302	1.682	2.018	2.418	2.698	3.296	3.538
	44	1.301	1.680	2.015	2.414	2.692	3.286	3.526
	46	1.300	1.679	2.013	2.410	2.687	3.277	3.515
	48	1.299	1.677	2.011	2.407	2.682	3.269	3.505
	50	1.299	1.676	2.009	2.403	2.678	3.261	3.496
	55	1.297	1.673	2.004	2.396	2.668	3.245	3.476
	60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
	65	1.295	1.669	1.997	2.385	2.654	3.220	3.447
	70	1.294	1.667	1.994	2.381	2.648	3.211	3.435
	80	1.292	1.664	1.990	2.374	2.639	3.195	3.416
	100	1.290	1.660	1.984	2.364	2.626	3.174	3.390
	150	1.287	1.655	1.976	2.351	2.609	3.145	3.357
	200	1.286	1.653	1.972	2.345	2.601	3.131	3.340
Two Tails		0.20	0.10	0.05	0.02	0.01	0.002	0.001

Table C The Chi-Squared distribution table

P										
DF	**0.995**	**0.975**	**0.20**	**0.10**	**0.05**	**0.025**	**0.02**	**0.01**	**0.005**	**0.002**
1	0.0000393	0.000982	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.550
2	0.0100	0.0506	3.219	4.605	5.991	7.378	7.824	9.210	10.597	12.429
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.860	16.924
5	0.412	0.831	7.289	9.236	11.070	12.833	13.388	15.086	16.750	18.907
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791
7	0.989	1.690	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601
8	1.344	2.180	11.030	13.362	15.507	17.535	18.168	20.090	21.955	24.352
9	1.735	2.700	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722
11	2.603	3.816	14.631	17.275	19.675	21.920	22.618	24.725	26.757	29.354
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.300	30.957
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32.000	34.267	37.146
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648
18	6.265	8.231	22.760	25.989	28.869	31.526	32.346	34.805	37.156	40.136
19	6.844	8.907	23.900	27.204	30.144	32.852	33.687	36.191	38.582	41.610
20	7.434	9.591	25.038	28.412	31.410	34.170	35.020	37.566	39.997	43.072