Course No: BUS1308
Course Title: statistics
Date:29/05/2014
No. of Questions: (6)
Time: 2hours
Using Calculator (yes)

University of Palestine

Final Exam
2014-2013
Total Grade:

Instructor Name: Dr Nafez Barakat
Student No.: _____
Student Name: _____
College Name: _____
Dep. / Specialist: _____
Using Dictionary (No)

Instructions:
1.Write your name and student ID.
2.You have 2 hours
3.This exam must be your own work entirely. You cannot talk to or share information with anyone.
4.Show all your work. Partial credit will only be given where sufficient understanding of the problem has been demonstrated and work is shown.

DON'T WRITE ON THIS TABLE

QUESTION	#1	#2	#3	#4	#5	#6	TOTAL
POINTS							

Question #1: [10 Points]

For each question in this section, circle the correct answer. Each problem is worth 2 points.

Write your choices in the following table

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q9	**Q10**						

1- If we wish to determine whether there is evidence that the proportion of items of interest is the same in group 1 as in group 2, the appropriate test to use is

a) the *Z* test b) the χ^2 test c) Both a) and b) d) Neither of a) nor b)

2- When testing for independence in a contingency table with 3 rows and 2 columns, there are _____ degrees of freedom.

a) 2 b) 5 c) 6 d) 12

Questions 3-4 refer to the following information:

3- A copy machine dealer has on the number x of copy machines at each of 89 customer locations and the number y of service calls in a month at each location. Summary calculations give

$$\bar{x}=8.4,\ s_x=2.1,\ \bar{y}=14.2,\ s_y=3.8,\ and\ r=0.86.$$

What is the slop of the least squares regression line of number of service calls on number of copiers?

a) 1.56 b) 0.48 c) None of these
d) Can't tell from the information given

4- About what percent of the variation in number of service calls is explained by the linear relation between number of service calls and the number of machines?

a) 86% b) 93% c) 74% d) None of these
e) Can't tell from the information given

Questions 5-6 refer to the following information:

5- A 95% confidence interval for the mean reading achievement score for a population of third grades is (40 , 50). The margin of error of this interval is

a) 95% b) 10 c) 5 d) 2.5
e) The answer cannot be determined from the information given

6- The sample mean is

a) 0.95 b) 45 c) 42.5 d) 47.5
e) The answer cannot be determined from the information given

7- Using the same set of data, you compute a 95% confidence interval and a 99% confidence interval. Which of the following statement is correct?

a) The intervals have the same width
b) The 99% interval is wider
c) The 95 % interval is wider
d) You cannot be determined which interval is wider unless you know n and s

8- The P-value for a z test of $H_0 : P = .5$ vs. $H_a : P < .5$, where $z = -2.36$ is:

a) $P(z > -2.36)$ b) $P(z < -2.36)$ c) $2P(z > -2.36)$ d) $2P(z > -2.36)$

9- A type I error is made by

a) failing to reject H_0 when it is true.
b) rejecting H_0 when it is false.
c) rejecting H_0 when it is true.
d) failing to reject H_0 when it is false.

10- The degrees of freedom of a paired t test based on $n = 20$ pairs is

a) 38 b) 20 c) 19 d) 10 e) None of these

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Question #2: [10 Points]

Weekly sales (in thousand of dollars) for individual stores based on the number of customers who made purchases. A random sample of 12 stores yields the following results:

$$\sum_{i=1}^{12} x_i = 8589, \sum_{i=1}^{12} y_i = 103.34, \sum_{i=1}^{12} x_i^2 = 6450413, \sum_{i=1}^{12} y_i^2 = 922.035, \sum_{i=1}^{12} x_i y_i = 76997.25$$

a) (6 Points) Compute the value of the coefficient of correlation. Interpret

b) (8 Points) Compute the values of the estimated intercept and slope. Interpret

c) (2 Points) Compute the prediction for the amount of sales for 1000 customers who made purchases.

d) (4 Points) Compute the value of the coefficient of determination. Interpret

Question #3: [10 Points]

A market researcher investigated consumer preferences for Coca-Cola and Pepsi before a taste test and after a taste test. The following table summarizes the results from a sample of 200 consumers:

PREFERENCE	SOFT DRINK	
	Coca-Cola	Pepsi
Before taste test	110	90
After taste test	118	82

Using a chi-square test to see if there is evidence of a difference in preference for Coca-Cola before and after the taste test by allowing a 5% probability of incorrectly concluding that there is a difference when there is in fact no difference.(critical value = 3.84)

- H_o:

  H_a:

- Test Statistic:

- Decision:

- Conclusion:

Question #4: [10 Points]

A company wanted to know if attending a course on "how to be a successful salesperson" can increase the average sales of its employees. The company sent six of its salespersons to attend this course. The following table gives the week sales of these salespersons before and after they attended this course.

Before	**12**	**18**	**25**	**9**	**14**	**16**
After	**18**	**24**	**24**	**14**	**19**	**20**

Using the 5% significance level, can you conclude that the mean weekly sales for all salespersons increase as a result of attending this course? Assume that the population of paired difference has a normal distribution.

- H_o:

  H_a:

- Test Statistic:

- Compute the “critical t value” or the rejection region:

- Decision:

- Conclusion:

Question #5: [10 Points]

In 2010, 5% of job applicants who were tested for smoking failed the test. At the 0.05 level, test the claim that the failure rate is now lower if a random sample of 1500 current job applicants results in 60 failures.

- H_o:

  H_a:

- Test Statistic:

- Compute the "p- value "

- Decision:

- Conclusion:

Question #6: [10 Points]

Apolitical analyst was curious if younger adults were becoming more conservative . He decided to see if the mean age of registered Republicans was lower than that of registered Democrats . He selected an SRS of 128 registered Republicans from a list of registered Republicans and determined the mean age to be $\bar{X}_1$ = 39 years , with a standard deviation S_1 = 8 years. He also selected an independent SRS of 200 registered Democrats from a list of registered Democrats and determined the mean age to be $\bar{X}_2$ = 40 years , with a standard deviation S_2 = 10 years. Let μ_1 and μ_2 represent the mean ages of the populations of all registered Republicans and Democrats , respectively . Suppose that the distribution of age in the population of registered Republicans and of registered Democrats have the same Standard deviation

- State H_o:

  H_a:
- Compute the test Statistic:

- Compute the critical value by using a level of significance $\alpha = 0.05$

- State your decision:

- What is your final conclusion

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Formulas:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$S = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

$$r = \frac{\sum_{i=1}^{n} x_i y_i - n\bar{x}\,\bar{y}}{\sqrt{\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)\left(\sum_{i=1}^{n} y_i^2 - n\bar{y}^2\right)}}$$

$$\hat{y} = a + bx, \quad b = r\frac{S_y}{S_x}, \quad a = \bar{y} - b\bar{x}$$

$$\chi^2_{STAT} = \sum_{\text{all cells}} \frac{(f_o - f_e)^2}{f_e}$$

$$\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$$

$$z = \frac{\bar{x} - \mu_\circ}{\sigma/\sqrt{n}}$$

$$\bar{x} \pm t\frac{s}{\sqrt{n}}, \ df = n - 1$$

$$t = \frac{\bar{x} - \mu_\circ}{s/\sqrt{n}},$$

$$t = \frac{\bar{D}}{S_D/\sqrt{n}}, \qquad D_i = X_{1i} - X_{2i},$$

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}}$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$$

$$df = n - 1$$

$$df = n - 1$$

$$\hat{p} \pm z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\frac{x - \mu_x}{\sigma_x} \quad \mu_{\bar{x}} = \mu, \ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$\mu_{\bar{x}_1 - \bar{x}_2} = \mu_1 - \mu_2$$

$$\mu_p = \pi, \ \sigma_p = \sqrt{\frac{\pi(1-\pi)}{n}}$$

$$(\bar{x}_1 - \bar{x}_2) \pm t^* s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

$$df = n_1 + n_2 - 2$$

$$df = n_1 + n_2 - 2$$

$$\sigma_{\bar{x}_1 - \bar{x}_2} = S_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$z = \frac{p - \pi_\circ}{\sqrt{\pi_\circ(1-\pi_\circ)/n}}, \ p = \frac{x}{n}$$

$$(p_1 - p_2) \pm z\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$$

$$p_1 = \frac{x_1}{n_1} \text{ and } p_2 = \frac{x_2}{n_2}$$

$$n = \left(\frac{Z\sigma}{e}\right)^2, \text{ e is the margin of error}$$

$$z = \frac{(p_1 - p_2) - (\pi_1 - \pi_2)}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$n = \left(\frac{Z}{e}\right)^2 p(1-p)$$

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Table entry for z is the area under the standard normal curve to the left of z.

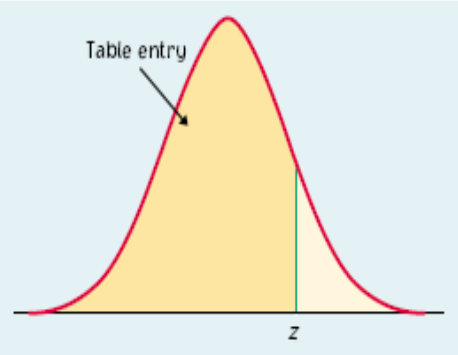

TABLE A Standard normal probabilities (*continued*)

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

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Table entry for p and C is the critical value t^* with probability p lying to its right and probability C lying between $-t^*$ and t^*.

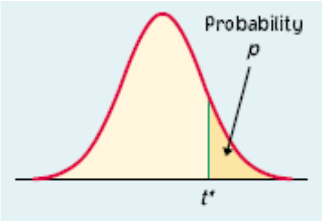

TABLE C t distribution critical values

	Upper tail probability p											
df	.25	.20	.15	.10	.05	.025	.02	.01	.005	.0025	.001	.0005
1	1.000	1.376	1.963	3.078	6.314	12.71	15.89	31.82	63.66	127.3	318.3	636.6
2	0.816	1.061	1.386	1.886	2.920	4.303	4.849	6.965	9.925	14.09	22.33	31.60
3	0.765	0.978	1.250	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.21	12.92
4	0.741	0.941	1.190	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
6	0.718	0.906	1.134	1.440	1.943	2.447	2.612	3.143	3.707	4.317	5.208	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.517	2.998	3.499	4.029	4.785	5.408
8	0.706	0.889	1.108	1.397	1.860	2.306	2.449	2.896	3.355	3.833	4.501	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.398	2.821	3.250	3.690	4.297	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.359	2.764	3.169	3.581	4.144	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.328	2.718	3.106	3.497	4.025	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.303	2.681	3.055	3.428	3.930	4.318
13	0.694	0.870	1.079	1.350	1.771	2.160	2.282	2.650	3.012	3.372	3.852	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.264	2.624	2.977	3.326	3.787	4.140
15	0.691	0.866	1.074	1.341	1.753	2.131	2.249	2.602	2.947	3.286	3.733	4.073
16	0.690	0.865	1.071	1.337	1.746	2.120	2.235	2.583	2.921	3.252	3.686	4.015
17	0.689	0.863	1.069	1.333	1.740	2.110	2.224	2.567	2.898	3.222	3.646	3.965
18	0.688	0.862	1.067	1.330	1.734	2.101	2.214	2.552	2.878	3.197	3.611	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.205	2.539	2.861	3.174	3.579	3.883
20	0.687	0.860	1.064	1.325	1.725	2.086	2.197	2.528	2.845	3.153	3.552	3.850
21	0.686	0.859	1.063	1.323	1.721	2.080	2.189	2.518	2.831	3.135	3.527	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.183	2.508	2.819	3.119	3.505	3.792
23	0.685	0.858	1.060	1.319	1.714	2.069	2.177	2.500	2.807	3.104	3.485	3.768
24	0.685	0.857	1.059	1.318	1.711	2.064	2.172	2.492	2.797	3.091	3.467	3.745
25	0.684	0.856	1.058	1.316	1.708	2.060	2.167	2.485	2.787	3.078	3.450	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.162	2.479	2.779	3.067	3.435	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.158	2.473	2.771	3.057	3.421	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.154	2.467	2.763	3.047	3.408	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.150	2.462	2.756	3.038	3.396	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.147	2.457	2.750	3.030	3.385	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.123	2.423	2.704	2.971	3.307	3.551
50	0.679	0.849	1.047	1.299	1.676	2.009	2.109	2.403	2.678	2.937	3.261	3.496
60	0.679	0.848	1.045	1.296	1.671	2.000	2.099	2.390	2.660	2.915	3.232	3.460
80	0.678	0.846	1.043	1.292	1.664	1.990	2.088	2.374	2.639	2.887	3.195	3.416
100	0.677	0.845	1.042	1.290	1.660	1.984	2.081	2.364	2.626	2.871	3.174	3.390
1000	0.675	0.842	1.037	1.282	1.646	1.962	2.056	2.330	2.581	2.813	3.098	3.300
z^*	0.674	0.841	1.036	1.282	1.645	1.960	2.054	2.326	2.576	2.807	3.091	3.291
	50%	60%	70%	80%	90%	95%	96%	98%	99%	99.5%	99.8%	99.9%
	Confidence level C											