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私立臺北醫學大學 92 學年度第 1 學期期末考試命(試)題紙

系級	科目	授課教師	考試日期	學號	姓名
公二	生物統計學	葉錦瑩 簡伶朱	93 年 01 月 12 日第 4 節		

請注意本試題共 3 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
每張試題卷務必填寫(學號)、(姓名)。

1. What is the "95% confidence interval"? (6%)

2. Why should we do the "hypothesis testing"? (6%)

3. What the difference between "p-value" and "α error"? (6%)

4. How the terms (i.e. α error, β error, σ^2, $\mu_1 - \mu_2$) influence the sample size in a independent t-test for the difference between two sample means? (8%)

5. In a country, the number of subjects who died from AIDS was averaged as 60. If there was 50 in last year, please comment the difference. Let $\alpha = .05$. (8%)

6. Szadoczky et al. examined the characteristics of ^{3}H-imipramine binding sites in seasonal (SAD) and non-seasonal (non-SAD) depressed patients and in healthy individuals (Control). One of the variables on which they took measurements was the density of binding sites for ^{3}H-imipramine on blood platelets. The results were as the following table. Please (1) list the statistical hypothesis, (2)fill blanks and (3)explain the result of one way –ANOVA. (16%)

Source of Variance	SS	df	MS	F	P-值
between	739072	2	369536	(e)	0.00005
within	(a)	(b)	(c)		
Total	1512055	30	(d)		

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7. In an air pollution study, a random sample of 200 households was selected from each of two communities. A respondent in each household was asked whether or not anyone in the household was bothered by air pollution. The responses were as following table. Can the researchers conclude that the two communities differ with respect to the variable of interest? Let α=.05. (8%)

Community	**Any member of household bothered by air pollution?**		
	Yes	**No**	**Total**
I	43	157	200
II	81	119	200
Total	124	276	400

8. Protoporphyrin levels were measured in two samples of subjects. Sample 1 consisted of 50 adult male alcoholics with ring sideroblasts in the bone narrow. Sample 2 consisted of 40 apparently healthy adult nonalcoholic males. The mean Protoporphyrin levels and standard deviations for the two samples were as following table. Can one conclude on the basis of these data that Protoporphyrin levels are higher in the represented alcoholic population than in the nonalcoholic population? Let α=0.01. (12%)

sample	n	mean	S
1	50	750	45
2	40	250	40

$$\frac{s_1^2/s_2^2}{F_{1-(\alpha/2),(n_1-1,n_2-1)}} < \frac{\sigma_1^2}{\sigma_2^2} < \frac{s_1^2/s_2^2}{F_{\alpha/2,(n_1-1,n_2-1)}}$$

$F_{.025(49,39)} = 0.5687 \qquad F_{.975(49,39)} = 1.756$

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9. Després et al. point out that the topography of adipose tissue (AT) is associated with metabolic complications considered as risk factors for cardiovascular disease. Computed tomography (CT), the only available technique that precisely and reliably measures the amount of deep abdominal AT, however, is costly and requires irradiation of the subject. Després and his colleagues conducted a study to develop equations, as following figure, to predict the amount of deep abdominal AT from simple anthropometrical measurements.

(1) Please fill blanks in the ANOVA table. (10%)

Source of Variance	SS	df	MS	F	$F_{.95(1,107)}$
Model	237549	1	(c)	(e)	3.94
Error	116982	107	(d)		
Total	(a)	(b)			

(2) Please list the statistical hypothesis. (4%)

(3) Please explain the result. (4%)

(4) Calculate and explain the coefficient of determination. (4%)

(5) Can you predict the amount of deep abdominal AT from an anthropometrical measurement with 100? (4%)

(6) Can you predict the amount of deep abdominal AT from an anthropometrical measurement with 150? (4%)

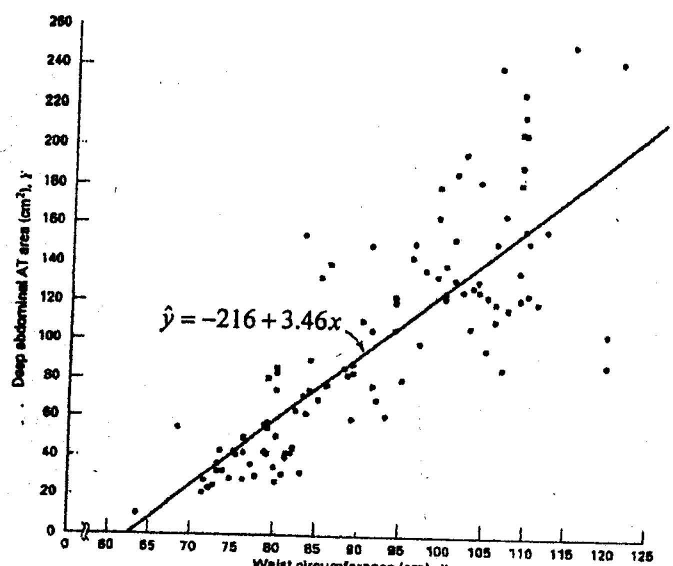

FIGURE 9.3.3 Original data and least-squares line for Example 9.3.1.

Abbreviated Table of t

Degrees of Freedom	α=0.05 $t_{.95}$	α=0.025 $t_{.975}$	α=0.01 $t_{.99}$	α=0.005 $t_{.995}$
1	6.3138	12.7062	31.8205	63.6567
2	2.9200	4.3027	6.9646	9.9248
3	2.3534	3.1824	4.5407	5.8409
4	2.1318	2.7764	3.7469	4.6041
5	2.0150	2.5706	3.3649	4.0321
6	1.9432	2.4469	3.1427	3.7074
7	1.8946	2.3646	2.9980	3.4995
8	1.8595	2.3060	2.8965	3.3554
9	1.8331	2.2622	2.8214	3.2498
10	1.8125	2.2281	2.7638	3.1693
15	1.7531	2.1314	2.6025	2.9467
20	1.7247	2.0860	2.5280	2.8453
25	1.7081	2.0595	2.4851	2.7874
30	1.6973	2.0423	2.4573	2.7500
40	1.6839	2.0211	2.4233	2.7045
50	1.6759	2.0086	2.4033	2.6778
60	1.6706	2.0003	2.3901	2.6603
120	1.6577	1.9799	2.3578	2.6174
200	1.6525	1.9719	2.3451	2.6006

Abbreviated Table of χ^2

Degrees of Freedom	α=0.05 $\chi^2_{.95}$	α=0.025 $\chi^2_{.975}$	α=0.01 $\chi^2_{.99}$	α=0.005 $\chi^2_{.995}$
1	3.481	5.024	6.635	7.879
2	5.991	7.378	9.210	10.597
3	7.815	9.348	11.341	12.838
4	9.488	11.143	13.277	14.860
5	11.02	12.832	15.086	16.750
6	12.592	14.449	16.812	18.548
7	14.067	16.013	18.475	20.278
8	15.507	17.535	20.090	21.955
9	16.919	19.023	21.666	23.589
10	18.307	20.483	23.209	25.188
15	24.996	27.488	30.578	32.801
20	31.41	34.170	37.566	39.997
25	37.652	40.646	44.314	46.928
30	43.773	46.979	50.892	53.672
40	55.758	59.342	63.691	66.766
50	67.505	71.420	76.154	79.490
60	79.082	83.298	88.379	91.952
120	146.567	152.211	158.950	163.648
200	233.994	241.058	249.445	255.264

Abbreviated Table of $F_{.95}$ (α=0.05)

df2\df1	1	2	3	4	5	6	7	8	9	10
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91
200	3.89	3.04	2.65	2.42	2.26	2.14	2.06	1.98	1.93	1.88

Abbreviated Table of $F_{.99}$ (α=0.01)

df2\df1	1	2	3	4	5	6	7	8	9	10
1	4052.18	4999.50	5403.35	5624.58	5763.65	5858.99	5928.36	5981.07	6022.47	6055.85
2	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05
6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80
50	7.17	5.06	4.20	3.72	3.41	3.19	3.02	2.89	2.78	2.70
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47
200	6.76	4.71	3.88	3.41	3.11	2.89	2.73	2.60	2.50	2.41