

考試科目	統計學 41712	系所別	財務管理	考試時間	2月18日(六) 第三節
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1. (30%) An insurance agent likes to sell two types of policies to his clients, selling them both life insurance and auto insurance. The following joint distribution summarizes the properties of the number of life insurance policies sold to an individual (X) and the number of auto policies (Y).

		X	
		0	1 life policy
Y	0	0.10	0.25
	1 auto policy	0.25	0.40

- (1) Find the expected value and variance of the number of life insurance policies. (6%)
 - (2) Find the expected value and variance of the number of auto insurance policies. (6%)
 - (3) Find the correlation between X and Y . (10%)
 - (4) The agent earns TWD7,500 from selling a life insurance policy and TWD4000 from selling an auto policy. What is the expected value and standard deviation of the earnings of this agent from policies sold to a client? (8%)
2. (20%) A toll-free phone number is available from 9 A.M to 9 P.M. for your customers to register complaints about a product purchased from your company. Past history indicates that an average of 0.8 calls is received per minute.
- (1) What properties must be true about the situation described here in order to use the Poisson distribution to calculate probabilities concerning the number of phone calls received in a one-minute period? (6%)
 - (2) What is the probability that during a one-minute period two or more phone calls will be received? (6%)
 - (3) What is the maximum number of phone calls that will be received in a one-minute period 99.99% of the time? (8%)
3. (25%) The following table summarizes whether the stock market went up or down during each trading day of a particular year.

		Day of week				
		Monday	Tuesday	Wednesday	Thursday	Friday
Market	Down	42	49	46	43	41
Direction	Up	53	55	58	59	58

Use the significance level 0.05 to answer the following questions.

- (1) Test whether the proportion of earning positive return for each day, the overall rate of this particular year, is 0.5. (7%)

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(2) Test whether the probabilities of earning positive return are equal when trading on Monday and Tuesday. (8%)

(3) Use a chi-squared test to determine if these data indicate that trading on some days is better or worse (more or less likely to earn positive returns) than any other. (10%)

4. (25%) The following table summarizes the playing time (in seconds) of a sample of 639 songs grouped by genre.

Genre	Blues	Country	Folk	Jazz	Latin	Rock
Mean	261.68	205.36	187.68	300.08	262.27	234.33
Standard deviation	84.57	68.23	67.68	122.69	83.37	103.30
Number of songs	19	96	63	192	22	247

(1) Test whether the population means of playing time for folk and country genres are equal with the significance level 0.05. (8%)

(2) Fit a multiple regression of rating on five dummy variables that represents the blues, country, folk, jazz, and Latin genres. The following table summarizes the estimated results. Fill in all the empty cells (a)-(l). (12%)

Term	Estimate	Standard error	t statistic
Intercept	(a)	6.448	(g)
Blues	(b)	24.127	(h)
Country	(c)	12.188	(i)
Folk	(d)	14.304	(j)
Jazz	(e)	9.750	(k)
Latin	(f)	22.548	(l)

(3) Compute the value of R^2 for the regression model in part (2). (5%)

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Table of the standard normal distribution

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9924	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9958	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986

備

註

- 一、作答於試題上者，不予計分。
二、試題請隨卷繳交。

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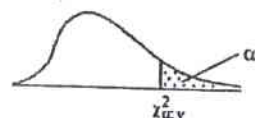
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Table of the Chi-square Distribution



$\alpha =$	0.995	0.99	0.98	0.975	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.05	0.025	0.01	0.005	0.001	$=\alpha$
$v = 1$	0.000043	0.000157	0.000238	0.000382	0.000693	0.00158	0.00442	0.0106	0.0240	0.0541	0.1024	0.1753	0.2749	0.4457	0.7173	1.0549	1.6268	2.1797	3.8415	$v = 1$
2	0.0100	0.0201	0.0404	0.0506	0.103	0.211	0.446	0.708	1.064	1.642	2.338	3.001	3.841	4.605	5.591	6.578	7.879	9.210	10.827	2
3	0.0717	0.115	0.185	0.216	0.352	0.584	1.005	1.642	2.338	3.001	3.841	4.605	5.591	6.578	7.879	9.210	10.827	12.838	14.860	3
4	0.207	0.297	0.429	0.484	0.711	1.064	1.649	2.366	3.119	3.940	4.779	5.689	6.756	7.879	9.148	10.591	12.401	14.267	16.268	4
5	0.412	0.554	0.752	0.831	1.145	1.610	2.343	3.123	3.935	4.756	5.629	6.628	7.779	9.032	10.392	11.968	13.838	15.709	17.759	5
6	0.676	0.872	1.134	1.237	1.635	2.204	3.070	3.858	4.635	5.493	6.353	7.378	8.553	9.886	11.267	12.838	14.860	16.750	18.551	6
7	0.989	1.239	1.564	1.690	2.167	2.833	3.822	4.603	5.398	6.344	7.378	8.553	9.886	11.267	12.838	14.860	16.750	18.551	20.278	7
8	1.344	1.646	2.032	2.180	2.733	3.490	4.594	5.398	6.344	7.378	8.553	9.886	11.267	12.838	14.860	16.750	18.551	20.278	22.027	8
9	1.735	2.088	2.532	2.700	3.325	4.168	5.380	6.344	7.378	8.553	9.886	11.267	12.838	14.860	16.750	18.551	20.278	22.027	23.589	9
10	2.156	2.558	3.059	3.247	3.940	4.865	6.179	7.378	8.553	9.886	11.267	12.838	14.860	16.750	18.551	20.278	22.027	23.589	25.188	10
11	2.603	3.053	3.609	3.816	4.575	5.578	6.989	8.181	9.392	10.827	12.401	14.067	15.985	17.779	19.675	21.666	23.589	25.188	26.757	11
12	3.074	3.571	4.178	4.404	5.226	6.304	7.807	9.012	10.242	11.668	13.274	15.013	16.913	18.909	20.904	22.966	24.736	26.217	27.688	12
13	3.565	4.107	4.765	5.009	5.892	7.042	8.634	9.849	11.070	12.592	14.267	16.070	17.939	19.985	22.041	24.154	26.217	27.688	29.154	13
14	4.075	4.660	5.368	5.629	6.571	7.790	9.467	10.670	11.891	13.412	15.126	16.995	18.879	20.985	23.041	25.188	27.188	28.845	30.191	14
15	4.601	5.229	5.985	6.262	7.261	8.547	10.307	11.511	12.732	14.267	16.070	17.939	19.985	22.041	24.154	26.217	28.145	29.829	31.319	15
16	5.142	5.812	6.614	6.908	7.962	9.312	11.152	12.465	13.686	15.207	17.000	18.909	20.985	23.041	25.188	27.204	29.191	30.829	32.000	16
17	5.697	6.408	7.255	7.564	8.672	10.085	12.002	13.312	14.533	16.154	18.000	19.985	22.041	24.154	26.217	28.204	30.191	31.526	32.671	17
18	6.265	7.015	7.906	8.231	9.390	10.865	12.857	14.067	15.288	16.899	18.756	20.779	22.838	24.904	27.000	29.191	31.319	32.909	33.409	18
19	6.844	7.633	8.567	8.907	10.117	11.651	13.716	15.013	16.234	17.939	19.985	22.041	24.154	26.217	28.204	30.191	31.526	32.909	33.997	19
20	7.434	8.260	9.237	9.591	10.851	12.443	14.578	15.808	17.027	18.909	20.985	23.041	25.188	27.204	29.191	31.319	32.909	33.997	34.820	20
21	8.034	8.897	9.915	10.283	11.591	13.240	15.445	16.671	17.892	19.813	21.904	24.000	26.154	28.191	30.191	32.179	33.997	34.820	35.566	21
22	8.643	9.542	10.600	10.982	12.338	14.041	16.314	17.501	18.712	20.713	22.838	24.904	27.000	29.191	31.319	33.409	34.820	35.566	36.191	22
23	9.260	10.196	11.293	11.688	13.091	14.848	17.187	18.398	19.609	21.426	23.526	25.628	27.729	29.830	31.931	33.932	34.820	35.566	36.781	23
24	9.886	10.856	11.992	12.401	13.648	15.659	18.062	19.273	20.484	22.237	24.338	26.439	28.540	30.641	32.742	34.820	35.566	36.781	37.154	24
25	10.520	11.524	12.697	13.120	14.411	16.473	18.940	20.107	21.308	23.041	25.188	27.204	29.191	31.319	33.409	35.566	36.781	37.154	37.566	25
26	11.160	12.198	13.409	13.844	15.179	17.292	19.820	21.013	22.114	23.847	25.958	28.059	30.060	32.161	34.262	36.363	37.566	38.885	38.932	26
27	11.808	12.879	14.125	14.573	16.151	18.114	20.703	22.512	23.614	25.315	27.416	29.517	31.618	33.719	35.819	37.920	38.932	39.829	39.829	27
28	12.461	13.565	14.847	15.308	16.928	18.939	21.588	23.027	24.326	26.427	28.528	30.629	32.729	34.830	36.931	39.032	39.829	40.729	40.729	28
29	13.121	14.256	15.574	16.047	17.708	19.768	22.475	23.539	24.837	26.938	29.039	31.139	33.239	35.339	37.440	39.542	40.729	41.629	41.629	29
30	13.787	14.933	16.306	16.791	18.493	20.599	23.364	24.450	25.650	27.749	30.040	32.140	34.241	36.342	38.441	40.542	41.629	42.529	42.529	30
40	20.706	22.164	23.838	24.433	26.509	29.031	32.345	34.269	36.193	38.167	40.282	42.557	44.985	47.561	50.154	52.785	55.459	58.121	60.621	40
50	27.991	29.707	31.664	32.357	34.764	37.689	41.449	43.829	46.154	48.582	51.059	53.682	56.339	59.032	61.682	64.382	67.154	69.989	72.809	50
60	35.535	37.485	39.699	40.482	43.188	46.459	50.641	53.972	57.339	60.682	64.082	67.561	71.029	74.482	77.929	81.354	84.759	88.129	91.529	60
70	43.275	45.442	47.893	48.758	51.739	55.329	59.898	63.682	67.509	71.382	75.209	79.082	82.929	86.754	90.582	94.382	98.154	101.929	105.682	70
80	51.171	53.539	56.213	57.153	60.391	64.278	69.207	73.405	77.629	81.882	86.154	90.429	94.682	98.929	103.154	107.354	111.529	115.682	119.809	80
90	59.196	61.754	64.634	65.646	69.126	73.291	78.558	83.154	87.754	92.354	96.954	101.554	106.154	110.754	115.354	119.954	124.554	129.154	133.754	90
100	67.327	70.065	73.142	74.222	77.929	82.358	87.945	92.882	97.882	102.882	107.882	112.882	117.882	122.882	127.882	132.882	137.882	142.882	147.882	100