

考 試 科 目	統計學 A	系 所 別	金融學系	考 試 時 間	2 月 6 日(二) 第四節
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1. (30%) A nationalwise sample survey shows that 40% of adults are committed to eating nutritious food when eating away from home. You decide to conduct a sample survey in your own area. You contact a simple random sample of 10 households by telephone.

(1) Five of the 10 respondents say they are concerned about nutrition. Is this reason to believe that the percent in your area is higher than the national 40%? (10%)

If you plan to contact a simple random sample of 600 households by telephone rather than just 10. Assume that the population proportion of adults concerned about nutritious food, $p=0.4$, is true.

(2) What is the probability that X lies between 220 and 230? (10%)

(3) What is the probability that 45% or more of respondents say they are concerned about nutrition? (10%)

2. (30%) The average cost per square foot for the office rental space in the central business district is NTD2358 according to a survey. A large real estate company wants to confirm this figure. The rent of per square foot paid by 100 offices in the central business district were investigated by the company. Suppose the sample average is NTD2288 per square foot, with a standard deviation of NTD511.

(1) Conduct a hypothesis test using 0.05 significance level to determine whether the cost per square foot reported by the survey should be rejected. (8%)

(2) If the decision in part (1) is to fail to reject and if the actual average cost per square foot is NTD2230, what is the probability of committing a Type II error? (12%)

(3) The probability of committing a Type II error is set at 0.1 in part (2). How large a sample is necessary to meet requirements? (10%)

3. (28%) A company wants to understand the impact of employee job satisfaction (score, Y , the higher the score, the higher the satisfaction) and their working experience (years,

X_1), salary (NTD\$1000, X_2) and gender (0 means female, 1 means male, X_3) relationship. The company's HR manager collected information from 25 employees and obtained the following estimation of the regression model

	Estimate	Standard error
Intercept	14.44	8.19
X_1	8.60	3.96
X_2	1.36	0.69
X_3	-5.95	3.30

$$SST=722.5, s=4.7$$

Here SST is the total sum of squares and s is the estimate of the standard deviation of the regression error.

(1) With a significance level of 0.05, test the significance of each regression coefficient in details and clearly

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H_0 , H_1 , test statsitc, etc. (12%)

(2) Calculate the adjusted coefficient of determination. (8%)

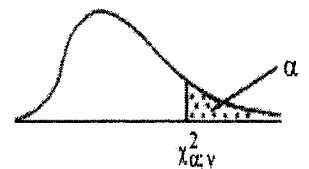
(3) Give the definition of the mean squared error (MSE), describe its menaing, and calculate MSE value. (8%)

4. (12%) A safety director samples at random from the file of minor accidents and classified them according to the time the accident took place

Time	Number of Accidents	Time	Number of Accidents
8 up to 9 A.M.	6	1 up to 2 P.M.	5
9 up to 10 A.M.	8	2 up to 3 P.M.	13
10 up to 11 A.M.	18	3 up to 4 P.M.	17
11 up to 12 P.M.	9	4 up to 5 P.M.	9

At the 0.02 significance level, can we conclude whether the accidents are evenly distributed throughout the day?

Table of the Chi-square Distribution



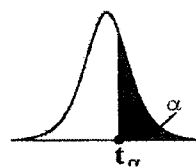
$\alpha =$	0.995	0.99	0.98	0.975	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.001	$=\alpha$
$V = 1$	0.0000393	0.000157	0.000628	0.000982	0.00393	0.0158	0.0642	0.162	0.2706	0.3841	0.5024	0.5412	0.635	0.7879	1.0827	1.3815	1.6268	1.8465	2.0517	2.2457	$V = 1$
2	0.0100	0.0201	0.0404	0.0506	0.103	0.211	0.446	0.719	1.065	1.378	1.678	1.924	2.179	2.338	2.578	2.798	3.000	3.219	3.438	3.641	2
3	0.0717	0.115	0.185	0.216	0.352	0.584	1.005	1.462	1.942	2.365	2.703	2.947	3.179	3.398	3.619	3.828	4.015	4.191	4.353	4.501	3
4	0.207	0.297	0.429	0.484	0.711	1.064	1.649	2.202	2.707	3.146	3.501	3.745	3.958	4.151	4.327	4.493	4.641	4.779	4.903	5.015	4
5	0.412	0.554	0.752	0.831	1.145	1.610	2.343	3.009	3.581	4.051	4.427	4.683	4.897	5.091	5.263	5.421	5.568	5.701	5.821	5.931	5
6	0.676	0.872	1.134	1.237	1.635	2.204	3.070	3.758	4.352	4.832	5.214	5.483	5.707	5.897	6.063	6.215	6.353	6.478	6.591	6.693	6
7	0.989	1.239	1.564	1.690	2.167	2.833	3.822	4.533	5.141	5.621	6.001	6.279	6.503	6.693	6.859	6.997	7.121	7.234	7.337	7.431	7
8	1.344	1.646	2.032	2.180	2.733	3.490	4.594	5.313	5.932	6.411	6.791	7.069	7.293	7.483	7.649	7.787	7.901	8.004	8.098	8.183	8
9	1.735	2.088	2.532	2.700	3.325	4.168	5.380	6.109	6.728	7.207	7.587	7.865	8.089	8.279	8.435	8.573	8.687	8.781	8.866	8.941	9
10	2.156	2.558	3.059	3.247	3.940	4.865	6.179	6.908	7.527	7.996	8.376	8.654	8.878	9.068	9.224	9.362	9.476	9.561	9.636	9.701	10
11	2.603	3.053	3.609	3.816	4.575	5.578	6.989	7.718	8.337	8.806	9.186	9.464	9.688	9.878	10.034	10.172	10.286	10.371	10.446	10.501	11
12	3.074	3.571	4.178	4.404	5.226	6.304	7.807	8.536	9.155	9.624	10.004	10.282	10.506	10.696	10.852	10.990	11.104	11.189	11.254	11.309	12
13	3.565	4.107	4.765	5.009	5.892	7.042	8.634	9.363	9.982	10.451	10.831	11.109	11.333	11.523	11.679	11.803	11.907	11.992	12.057	12.102	13
14	4.075	4.660	5.368	5.629	6.571	7.790	9.467	10.206	10.825	11.294	11.674	11.952	12.176	12.366	12.522	12.646	12.750	12.835	12.890	12.925	14
15	4.601	5.229	5.985	6.262	7.261	8.547	10.307	11.046	11.665	12.134	12.514	12.792	13.016	13.206	13.362	13.486	13.580	13.655	13.700	13.725	15

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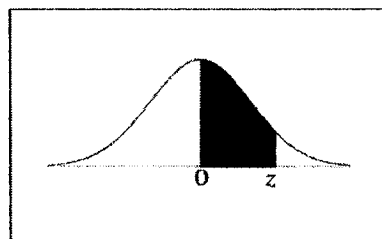
Percentage Points of the t Distribution; $t_{v, \alpha}$
 $P(T > t_{v, \alpha}) = \alpha$



v	α													
	0.40	0.30	0.20	0.15	0.10	0.05	0.025	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706	15.895	21.205	31.821	42.434	63.657	127.322	636.590
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303	4.849	5.643	6.965	8.073	9.925	14.089	31.598
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	0.259	0.538	0.870	1.079	1.350	1.771	2.160	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052	2.158	2.291	2.473	2.598	2.771	3.057	3.690
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045	2.150	2.282	2.462	2.586	2.756	3.038	3.659
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021	2.123	2.250	2.423	2.542	2.704	2.971	3.551
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980	2.076	2.196	2.358	2.468	2.617	2.860	3.373
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960	2.054	2.170	2.326	2.432	2.576	2.807	3.291

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Standard Normal Distribution Table



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。