國立政治大學 101 學年度碩士班招生考試試題

考試科目	統計學	所別	4171 財務管理	考試時間	2月26日(日)第 二 節

1. (12%) According to survey data, college students carried an average of \$3173 credit card debt in 2008. Suppose the probability distribution of the current credit card debts for all college students is known but its mean is \$3173 and the standard deviation is \$750.

   (1) Find the probability that credit card debt for a randomly selected college student is between \$2109 and \$3605.

   (2) Let $\bar{x}$ be the mean credit card debt of a random sample of 400 college students. What is the probability that the mean of the current credit card debts for this sample is within \$70 of the population mean?

2. (14%) One of the major oil products companies conducted a study recently to estimate the mean gallons of gasoline purchased by customers per visit to a gasoline station. To do this, a random sample of customers was selected with the following data being recorded that show the gallons of gasoline purchased.

8.7	22.4	9.5	13.3	18.9
22.0	14.4	35.7	19.0	24.9
5.7	15.7	8.9	22.5	15.9

   (1) Please construct and interpret a 95 percent confidence interval estimate for the population mean.

   (2) How large should the sample size be if we require in order for a 95% confidence interval for the average gallons of gasoline purchased to have a margin error equal to 0.5 gallon.

3. (12%) A financial analyst is interested in estimating the proportion of publicly traded companies on the Taiwan Stock Exchange that have cash balances that are more than 10 percent of the total assets of the company. A random sample of $n = 100$ companies shows that 13 had cash balances of more than 10 percent of assets.

   (1) Based on this information, develop and interpret a 90 percent confidence interval estimate for the population proportion.

   (2) Test whether the sample information supports the population proportion is greater than 10 percent at the 0.05 level of significance. Use the p-value approach.

4. (12%) An insurance company has determined that each week an average of nine claims are filed in their Atlanta branch. What is the probability that during the next week

   (1) exactly seven claims will be filed?

備註	試題隨卷繳交

考試科目	統計學	所別	4171 財務管理B	考試時間	2月26日(日)第二節

(2) no claims will be filed?

(3) less than four claims will be filed?

5. (50%) A job placement company is interested in developing a model that might be used to explain the variation in starting salaries for college graduates based on the college GPA. The following data were collected through a random sample of the clients with which this company has been associated.

Observation	GPA	Starting salary	GPA×(Starting salary)	GPA^2
1	3.2	35,000	112000	10.24
2	3.4	29,500	100300	11.56
3	2.9	30,000	87000	8.41
4	3.6	36,400	131040	12.96
5	2.8	31,500	88200	7.84
6	2.5	29,000	72500	6.25
7	3.0	33,200	99600	9.00
8	3.6	37,600	135360	12.96
9	2.9	32,000	92800	8.41
10	3.5	36,000	126000	12.25
sum	31.4	330200	1044800	99.8
sum of squares	99.88	10989460000		

(1) Please construct a box and whisker plot for the starting salary of college graduates based on these sample data. Also interpret the resulting plot. (10%)

(2) Test whether the population mean of starting salary for college graduates is greater than 32,000 at the 0.05 level of significance. Use the critical value approach. (7%)

(3) Determine the least squares regression model in starting salaries is explained by GPA. Also interpret the partial regression coefficients. (10%)

(4) If the residual sum of squares is 36760062, determine what percent of the variation in starting salaries is explained by GPA. (5%)

(5) Please construct the analysis of variance table for this regression model. (7%)

(6) Test to determine whether the regression model is statistically significant at the 0.05 level of significance. (6%)

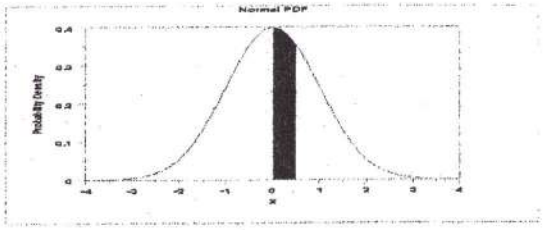
(7) Compute the standard error of the regression model and compare it with the standard deviation of the response variable, starting salary. (5%)

備註	試題隨卷繳交

國立政治大學 101 學年度碩士班招生考試試題

考試科目	統計學	所別	4101 財務管理	考試時間	2月26日(日) 第 二 節

Cumulative Distribution Function of the Standard Normal Distribution



$P(0 \leq x \leq a)$

	Area under the Normal Curve from 0 to X									
x	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	0.0754
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	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	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	0.2996	0.3023	0.3051	0.3079	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	0.4430	0.4441
1.6	0.4452	0.4463	0.4474	0.4485	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	0.4700	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4762	0.4767
2.0	0.4773	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	0.4865	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	0.4980	0.4980	0.4981
2.9	0.4981	0.4982	0.4983	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

備註	試題隨卷繳交

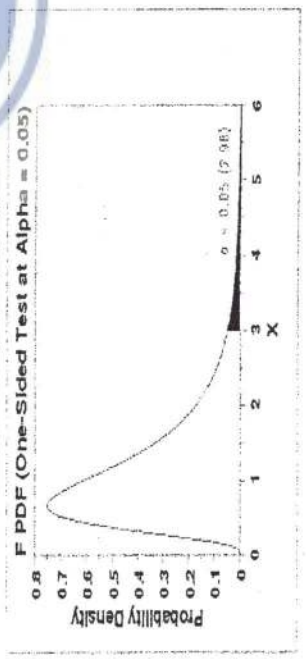
考試科目	統計學	所別	401 財務管理	考試時間	2月26日(日)第二節

Upper critical values of Student's t distribution with ν degrees of freedom

	Probability of exceeding the critical value					
ν	0.1	0.05	0.025	0.01	0.005	0.001
1	3.078	6.314	12.706	31.821	63.657	318.313
2	1.886	2.920	4.303	6.965	9.925	22.327
3	1.638	2.353	3.182	4.541	5.841	10.215
4	1.533	2.132	2.776	3.747	4.604	7.173
5	1.476	2.015	2.571	3.365	4.032	5.893
6	1.440	1.943	2.447	3.143	3.707	5.208
7	1.415	1.895	2.365	2.998	3.499	4.782
8	1.397	1.860	2.306	2.896	3.355	4.499
9	1.383	1.833	2.262	2.821	3.250	4.296
10	1.372	1.812	2.228	2.764	3.169	4.143
11	1.363	1.796	2.201	2.718	3.106	4.024
12	1.356	1.782	2.179	2.681	3.055	3.929
13	1.350	1.771	2.160	2.650	3.012	3.852
14	1.345	1.761	2.145	2.624	2.977	3.787
15	1.341	1.753	2.131	2.602	2.947	3.733
16	1.337	1.746	2.120	2.583	2.921	3.686
17	1.333	1.740	2.110	2.567	2.898	3.646
18	1.330	1.734	2.101	2.552	2.878	3.610
19	1.328	1.729	2.093	2.539	2.861	3.579
20	1.325	1.725	2.086	2.528	2.845	3.552

Upper Critical Values of the F Distribution

$v_1 \backslash v_2$	1	2	3	4	5	6	7	8	9	10
1	161.448	199.500	215.707	224.583	230.162	233.986	236.768	238.882	240.543	241.882
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.786
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637
8	5.318	4.459	4.066	3.838	3.687	3.581	3.500	3.438	3.388	3.347
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671



$F_{v_1=10,v_2=10,\alpha=0.05}$

備註	試題隨卷繳交