銘傳大學八十九學年度二年制在職進修專班招生考試

第二節

統計學 試題

可使用計算機

一、 請敘述說明中央極限定理。(8%)

二、 文山高中為了解該校學生戴眼鏡的比例 ρ ，隨機從全校學生中抽出 100 位同學，結果有 60 位同學戴眼鏡。

(1) 試估計 ρ 值。(5%)

(2) 試求 ρ 的 95%信賴區間。(10%)

(3) 若實際上 $\rho = 0.7$，則你在上述(2)中算出的信賴區間包含 ρ 的機率為多少？(5%)

(4) 請以此比例說明下列名詞：(a) population (b) sample (c) parameter (d) statistic(12%)

三、 一袋中有 20 個大小相同的球，其中 12 個黑球，8 個白球。現從袋中抽取 10 次，每次只抽一個球，令 X 代表抽取 10 次中抽到的黑球數。

(1) 在抽出放回的情況下，試寫出 X 之機率函數。(5%)

(2) 在抽出不放回的情況下，試寫出 X 之機率函數。(5%)

四、 某工廠使用三部機器 M1，M2 和 M3 生產同一產品，每天產量分別為 2000，3000 及 5000 件。已知此三部機器不良率分別為 0.01，0.02 和 0.01。現由某天所生產的 10000 件產品中，隨機抽出一件檢查，結果為不良品。試問該不良品是由第一部機器 M1 生產的機率為多少？（假設每件產品被抽到的機率都相同）(10%)

五、 在一次抽樣調查中隨機訪問 1000 位成年人，詢問它們對某一法案的支持度，調查結果如下：

	支持	反對	沒意見
男性	300	120	60
女性	120	240	160

試取顯著水準 $\alpha = 0.05$，檢定性別與對此一法案的支持度是否相關？(10%)

六、 為比較 A,B,C,D 四種廠牌 1600cc 的汽車平均每公升汽油能行駛的里程數是否相同，隨機從 A,B,C,D 四種廠牌汽車中分別抽出 5 部汽車實驗。資料如下：(單位：公里)

A	B	C	D
12	14	16	10
13	16	15	17
16	12	15	12
10	13	9	14
15	12	12	11

(1) 一般從事變藝術分析時有哪些假設？(6%)

(2) 若假設條件均能滿足，試取顯著水準 $\alpha = 0.05$，檢定這四種廠牌汽車平均每公升汽油能行駛的里程數是否相同？(14%)

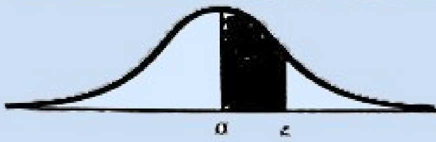
七、 設隨機變數 X 的機率分配如下：

x	-2	0	3
Fx(x)	0.3	0.3	0.4

(1) 試求 X 的期望值。(5%)

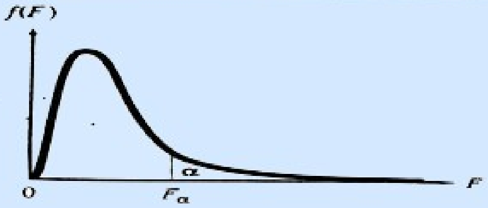
(2) 試求 X 的分配函數。(5%)

Normal Curve Areas



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
.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

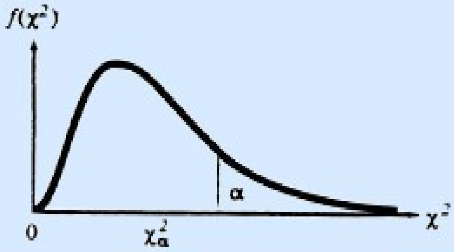
Percentage Points of the *F*-distribution, $\alpha = .05$



ν_2 \ ν_1 (NUMERATOR DEGREES OF FREEDOM)	1	2	3	4	5	6
1	161.4	199.5	215.7	224.6	230.2	234.0
2	18.51	19.00	19.16	19.25	19.30	19.33
3	10.13	9.55	9.28	9.12	9.01	8.94
4	7.71	6.94	6.59	6.39	6.26	6.16
5	6.61	5.79	5.41	5.19	5.05	4.95
6	5.99	5.14	4.76	4.53	4.39	4.28
7	5.59	4.74	4.35	4.12	3.97	3.87
8	5.32	4.46	4.07	3.84	3.69	3.58
9	5.12	4.26	3.86	3.63	3.48	3.37
10	4.96	4.10	3.71	3.48	3.33	3.22
11	4.84	3.98	3.59	3.36	3.20	3.09
12	4.75	3.89	3.49	3.26	3.11	3.00
13	4.67	3.81	3.41	3.18	3.03	2.92
14	4.60	3.74	3.34	3.11	2.96	2.85
15	4.54	3.68	3.29	3.06	2.90	2.79
16	4.49	3.63	3.24	3.01	2.85	2.74
17	4.45	3.59	3.20	2.96	2.81	2.70
18	4.41	3.55	3.16	2.93	2.77	2.66
19	4.38	3.52	3.13	2.90	2.74	2.63
20	4.35	3.49	3.10	2.87	2.71	2.60
21	4.32	3.47	3.07	2.84	2.68	2.57
22	4.30	3.44	3.05	2.82	2.66	2.55
23	4.28	3.42	3.03	2.80	2.64	2.53
24	4.26	3.40	3.01	2.78	2.62	2.51
25	4.24	3.39	2.99	2.76	2.60	2.49
26	4.23	3.37	2.98	2.74	2.59	2.47

DENOMINATOR DEGREES OF FREEDOM

Critical Values of χ^2



Degrees of Freedom	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	2.70554	3.84146	5.02389	6.63490	7.87944
2	4.60517	5.99147	7.37776	9.21034	10.5966
3	6.25139	7.81473	9.34840	11.3449	12.8381
4	7.77944	9.48773	11.1433	13.2767	14.8602
5	9.23635	11.0705	12.8325	15.0863	16.7496
6	10.6446	12.5916	14.4494	16.8119	18.5476
7	12.0170	14.0671	16.0128	18.4753	20.2777
8	13.3616	15.5073	17.5346	20.0902	21.9550
9	14.6837	16.9190	19.0228	21.6660	23.5893
10	15.9871	18.3070	20.4831	23.2093	25.1882
11	17.2750	19.6751	21.9200	24.7250	26.7569
12	18.5494	21.0261	23.3367	26.2170	28.2995
13	19.8119	22.3621	24.7356	27.6883	29.8194
14	21.0642	23.6848	26.1190	29.1413	31.3193
15	22.3072	24.9958	27.4884	30.5779	32.8013
16	23.5418	26.2962	28.8454	31.9999	34.2672
17	24.7690	27.5871	30.1910	33.4087	35.7185
18	25.9894	28.8693	31.5264	34.8053	37.1564
19	27.2036	30.1435	32.8523	36.1908	38.5822
20	28.4120	31.4104	34.1696	37.5662	39.9968

試題完