

# 淡江大學 106 學年度日間部寒假轉學生招生考試試題

系別：統計學系三年級

科目：統計與機率

36-1

考試日期：1月6日(星期六) 第2節

本試題共 5 大題，

2 頁

計算題，證明題，須詳列運算過程

1. 試判別下列資料，那些屬於計量資料(quantitative data)，那些屬於計質資料(qualitative data)。(20分)

- |                  |                  |
|------------------|------------------|
| (1) 某公司員工的教育程度   | (6) 某大學的學生人數     |
| (2) 甲地區一月份的降雨量   | (7) 甲公司員工的職位等級   |
| (3) 某學校教師的宗教信仰   | (8) 某閱覽室所陳列的雜誌類型 |
| (4) 甲大學學生的體重     | (9) 甲游泳池池水的溫度    |
| (5) 甲員工一年內請病假的天數 | (10) 福袋內彩球的顏色    |

2. A manufacturer has three production lines A, B, and C. The manager observed the quantity of output in 4, 4, and 3 days for A, B, and C, respectively, and the mean values of output are 6.75, 8.75, and 14. The manager constructed the following ANOVA table.

Variation	Sum of squares	Degrees of freedom	Mean square	F value
Between	(A)	(D)	(F)	(G)
Within	(B)	(E)	0.9375	
Total	(C)	10		

(1) Find the values of (A), (B), (C), (D), (E), (F), and (G). (14分)

(2) At  $\alpha = 0.05$ , is there enough evidence to conclude that at least one of the mean output is different from the others? (6分)

3. The average salary for graduates entering the actuarial field is \$40000. If the salaries are normally distributed with a standard deviation of \$5000, find the probability that

- (1). An individual graduate will have salary over \$45000. (10分)
- (2). A group of nine graduates will have a group average over \$45000. (10分)

4. Suppose that the distribution of a random variable  $X$  is

$$f(x) = \begin{cases} 2x, & 0 < x < 1, \\ 0, & \text{otherwise.} \end{cases}$$

(1). Show that  $f$  is, indeed, a probability density function. (5分)

(2). Compute  $E(X)$  and  $E(2X + 1)$ . (10分)

(3). Obtain  $Var(X)$  and  $Var(2X + 1)$ . (10分)

# 淡江大學 106 學年度日間部寒假轉學生招生考試試題

36-2

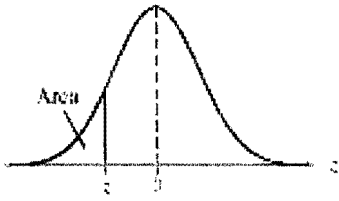
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本試題共 5 大題， 2 頁

5. Let the random variable  $X$  have an exponential distribution with mean 1. Set  $Y = 1 - e^{-X}$ . Derive the probability density function of  $Y$ . (15 分)



z	.09	.08	.07	.06	.05	.04	.03	.02	.01	.00
-3.4	.0002	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003
-3.3	.0003	.0004	.0004	.0004	.0004	.0004	.0004	.0005	.0005	.0005
-3.2	.0005	.0005	.0005	.0006	.0006	.0006	.0006	.0006	.0007	.0007
-3.1	.0007	.0007	.0008	.0008	.0008	.0008	.0009	.0009	.0009	.0010
-3.0	.0010	.0010	.0011	.0011	.0011	.0012	.0012	.0013	.0013	.0013
-2.9	.0014	.0014	.0015	.0015	.0016	.0016	.0017	.0018	.0018	.0019
-2.8	.0019	.0020	.0021	.0021	.0022	.0023	.0023	.0024	.0025	.0026
-2.7	.0026	.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034	.0035
-2.6	.0036	.0037	.0038	.0039	.0040	.0041	.0043	.0044	.0045	.0047
-2.5	.0048	.0049	.0051	.0052	.0054	.0055	.0057	.0059	.0060	.0062
-2.4	.0064	.0066	.0068	.0069	.0071	.0073	.0075	.0078	.0080	.0082
-2.3	.0084	.0087	.0089	.0091	.0094	.0096	.0099	.0102	.0104	.0107
-2.2	.0110	.0113	.0116	.0119	.0122	.0125	.0129	.0132	.0136	.0139
-2.1	.0143	.0146	.0150	.0154	.0158	.0162	.0166	.0170	.0174	.0179
-2.0	.0183	.0188	.0192	.0197	.0202	.0207	.0212	.0217	.0222	.0228
-1.9	.0233	.0239	.0244	.0250	.0256	.0262	.0268	.0274	.0281	.0287
-1.8	.0294	.0301	.0307	.0314	.0322	.0329	.0336	.0344	.0351	.0359
-1.7	.0367	.0375	.0384	.0392	.0401	.0409	.0418	.0427	.0436	.0446
-1.6	.0455	.0465	.0475	.0485	.0495	.0505	.0516	.0526	.0537	.0548
-1.5	.0559	.0571	.0582	.0594	.0606	.0618	.0630	.0643	.0655	.0668
-1.4	.0681	.0694	.0708	.0721	.0735	.0749	.0764	.0778	.0793	.0808
-1.3	.0823	.0838	.0853	.0869	.0885	.0901	.0918	.0934	.0951	.0968
-1.2	.0985	.1003	.1020	.1038	.1056	.1075	.1093	.1112	.1131	.1151
-1.1	.1170	.1190	.1210	.1230	.1251	.1271	.1292	.1314	.1335	.1357
-1.0	.1379	.1401	.1423	.1446	.1469	.1492	.1515	.1539	.1562	.1587
-0.9	.1611	.1635	.1660	.1685	.1711	.1736	.1762	.1788	.1814	.1841
-0.8	.1867	.1894	.1922	.1949	.1977	.2005	.2033	.2061	.2090	.2119
-0.7	.2148	.2177	.2206	.2236	.2266	.2296	.2327	.2358	.2389	.2420
-0.6	.2451	.2483	.2514	.2546	.2578	.2611	.2643	.2676	.2709	.2743
-0.5	.2776	.2810	.2843	.2877	.2912	.2946	.2981	.3015	.3050	.3085
-0.4	.3121	.3156	.3192	.3228	.3264	.3300	.3336	.3372	.3409	.3446
-0.3	.3483	.3520	.3557	.3594	.3632	.3669	.3707	.3745	.3783	.3821
-0.2	.3859	.3897	.3936	.3974	.4013	.4052	.4090	.4129	.4168	.4207
-0.1	.4247	.4286	.4325	.4364	.4404	.4443	.4483	.4522	.4562	.4602
-0.0	.4641	.4681	.4721	.4761	.4801	.4840	.4880	.4920	.4960	.5000

$F_{0.05(3,8)} = 4.07; F_{0.05(2,8)} = 4.46; F_{0.05(2,10)} = 4.10$