

(答案請寫於答案卷上)

需列計算過程，否則不予計分

(總計14題，每題分數標示於該題前)

第一部分：計算填充題，共十題。

In the following TEN questions, please fill in the blanks by real number, "any value," "greater than," "less than," "equal to," or "greater than, less than, or equal to."

- (5%) In a one-way ANOVA, if the null hypothesis, $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$, is not accepted, we may conclude that the variation among sample means is (1) the variation of within sample means.
- (5%) Following the above question, if the sample mean of level one is not different from that of level two, three, or four, and the sample mean of level two is equal to four, then the sample mean of level three is (2).
- (5%) Following the above question, in the ANOVA table, the p -value of main effect is (3) 0.05.
- (5%) In a two-way ANOVA, there are three levels in each of the two factors. If the main effect for each of two factors is significant, the p -value of interaction effect is (4) 0.05.
- (5%) The following table shows the number of mosquitoes and cockroaches found in John's kitchen and the stock price of the company John works for from day 1 to day 9.

Day	1	2	3	4	5	6	7	8	9
# of mosquitoes found	2	4	6	8	10	12	14	16	18
# of cockroaches found	10	9	8	7	6	5	4	3	2
Stock price	.5	1	1.5	2	2.5	3	3.5	4	4.5

On day 10, the total number of mosquitoes and cockroaches found in John's kitchen is equal to (5).

- (5%) Following the above question, the correlation coefficient between the number of mosquitoes and the company stock price is positive, and that between the number of cockroaches and the company stock price is negative. The correlation coefficient between the total number of mosquitoes and cockroaches and the company stock price is (6).
- (5%) Following question 5, John realizes that the above table shows a positive correlation between the number of mosquitoes found in John's kitchen and the company's stock price. In an attempt to manipulate the company's stock price, John opens all the windows and doors of the house, and successfully increases the number of mosquitoes found in John's kitchen to be 35 on day 12, the company's stock price on day 12 is (7).

見背面

8. (5%) In a dataset, X is able to perfectly predict Y . If the scatterplot of X and Y shows a bottom half circle, then the correlation coefficient of X and Y is (8).
9. (5%) A researcher studies 194 businesses in either semiconductor or retailing industry. The profitability is shown below. To exam the association between the type of business and profitability, the research calculates the chi-square statistic. Rounded to the third decimal place, the chi-square = (9).

	Profit	Loss
Semiconductor	15	11
Retailing	75	93

- 10.(5%) In order to identify the most effective endorsement, the marketer of Citizen watch is examining four commercials by equal sample sizes: two types of endorsers (金城武 vs. 舒淇) by two contexts (Modern vs. Classic). An ANOVA of test market shows that the interaction effect of commercial endorsed by 舒淇 in the modern context is -250 (units). The interaction effect of commercial endorsed by 金城武 in the modern context is (10) (units).

第二部份：計算說明題，共四題。

- 11.(20%) 小潔每天搭乘台北捷運通勤上班，交通尖峰時間人潮眾多，車廂內乘客都被擠得動彈不得，小潔勉強只能偶爾轉轉頭或動動眼，觀察附近乘客的動態，聊以為樂。有一天，她發現擠在她隔壁的陌生乘客正在用智慧型手機看臉書 (Facebook)，不時抿嘴竊笑。小潔很好奇，就側過頭去稍微看了一下，看到隔壁乘客剛好對他臉書上的某篇貼文按了讚。小潔再仔細一看，被按讚的那篇文章，竟然是她朋友阿克的心情分享！小潔剛才還在月台上等車的時候，也有對那篇文章按讚！小潔大吃一驚，心想說這也太巧了吧！這種事情的機率實在很低...
- 請問，如何估計「你/妳在捷運車廂內看到隔壁陌生乘客對兩人共同朋友的臉書貼文按讚」這件事的機率？請以分解法說明你/妳的估計模式。
- 12.(10%) 已知母體資料甚大，從母體資料中隨機抽選五個樣本。請問母體資料的中位數落在此五個樣本中最大值與最小值之間的機率為何？請說明計算過程。
- 13.(10%) 某餐廳的客服部門主管定期執行顧客滿意度調查。最新的調查結果顯示有 8% 的顧客對他們上一次在該餐廳用餐時所得到的服務感到不滿意。在不滿意的顧客當中，只有 22% 在一年之內再次回到該餐廳消費。在感到滿意的顧客當中，有 64% 在一年之內會回到該餐廳消費。今日有一位顧客用完餐填答滿意度調查問卷，得知他上一次在此餐廳消費是在一年之內。請問，此顧客對上次得到的服務感到滿意的機率為何？

- 14.(a) (3%) 以 90% 的信心水準且誤差範圍在 0.03 之內，請問估計一個母體比例值所需要的樣本大小是多少？假設樣本比例值未知。
- (b) (3%) 假設你知道樣本比例值應該不會小於 0.75，請重做 (a) 小題。
- (c) (4%) 假設使用 (b) 的計算結果得到樣本大小，發現樣本比例值為 0.92。請以 90% 的信心水準估計母體比例值。

見背面

Standard Normal Cumulative Probability Table

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	0.9925	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	0.9959	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
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

試題隨卷繳回