

中原大學 100 學年度 碩士班 入學考試

3 月 19 日 15:30~17:00

國際經營與貿易學系

誠實是我們珍視的美德，
我們喜愛「拒絕作弊，堅守正直」的你！
(共 3 頁第 1 頁)

科目：統計學

可使用計算機，惟僅限不具可程式及多重記憶者

不可使用計算機

答案精確到小數點第 4 位，沒有計算過程不給分。

1. In order to estimate the difference between the average miles per gallon of two different models of automobiles, samples are taken and the following information is collected.

	Model A	Model B
Sample Size	20	25
Sample Mean	32	36
Sample Variance	9	10

- (a). Assume that both populations are normal distributed and the variances of the two populations are equal. At 95% confidence develop an interval estimate for the difference between the average miles per gallon for the two models. (10%)
- (b). Assume that the forms of both populations are unknown but the variances of the two populations are 10 and 12, respectively ($\sigma_A^2 = 10, \sigma_B^2 = 12$). At 95% confidence develop an interval estimate for the difference between the average miles per gallon for the two models. (10%)
2. Assume you are taking two courses this semester (A and B). The probability that you will pass course A is 0.835, the probability that you will pass both courses is 0.276. The probability that you will pass at least one of the courses is 0.981.
- (a). What is the probability that you will pass course B? (5%)
- (b). Is the passing of the two courses independent events? Use probability information to justify your answer. (5%)
- (c). Are the events of passing the courses mutually exclusive? Explain. (5%)
3. The life expectancy of Timely brand watches is normally distributed with a mean of four years and a standard deviation of eight months.
- (a). What is the probability that a randomly selected watch will be in working condition for more than five years? (5%)
- (b). The company has a three-year warranty period on their watches. What percentage of their watches will be in operating condition after the warranty period? (5%)
- (c). What is the minimum and the maximum life expectancy of the middle 95% of the watches? (5%)
- (d). Ninety-five percent of the watches will have a life expectancy of at least how many months? (5%)

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4. It is believed that sales of books at a local bookstore follow a Poisson distribution. Below you are given information on the number of books sold during a sample of 15-minute intervals.

Number of Books	Frequency
0	2
1	3
2	12
3	16
4	19
5	20
6	18
7	16
8	9
9	5

- (a). What is the average number of books sold during a 15-minute period? (2%)
- (b). Using the Poisson distribution, find the probability associated with the number of books sold and generate the expected number of books sold. (5%)
- (c). State the null and alternative hypotheses and calculate the test statistic. (5%)
- (d). The hypothesis is to be tested at the 5% level. What is the critical value from the table for the test and what is your conclusion? (3%)
5. Let $f(x, y) = 8xy$, $0 < y < x < 1$ be the joint probability density function for random variables x and y . Please find $E(Y | x)$. (15%)
6. 近來國際糧食價格上漲，執政當局為確保台灣糧食安全，擬調整當前的稻米政策，但在調整政策之前，必需先對國人稻米之消費行為作一分析。研究部門需要以下資訊：(1) 稻米之價格需求彈性 ($E_d = \frac{dQ}{dP} \frac{P}{Q}$) 是否小於 -1，(2) 稻米與麵粉之交叉彈性且兩者是否顯著地互為替代品，(3) 稻米之所得彈性及是否為劣等財，(4) 冬天稻米消費量是否較多。
- (a). 為達到以上之研究目的，請建立必要之迴歸模型，並明確定義所有變數名稱。(7%)
- (b). 針對上述 4 個研究目的，請分別建立虛無假設及對立假設。(8%)

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$$t_{0.05,(44)} = 1.6802, t_{0.05,(43)} = 1.6811, t_{0.05,(42)} = 1.6820$$

$$t_{0.025,(44)} = 2.0154, t_{0.025,(43)} = 2.0167, t_{0.025,(42)} = 2.0181$$

$$x_{0.025,(7)}^2 = 16.0128, x_{0.025,(8)}^2 = 17.5345, x_{0.025,(9)}^2 = 19.0228$$

$$x_{0.05,(7)}^2 = 14.0671, x_{0.05,(8)}^2 = 15.5073, x_{0.05,(9)}^2 = 16.9190$$

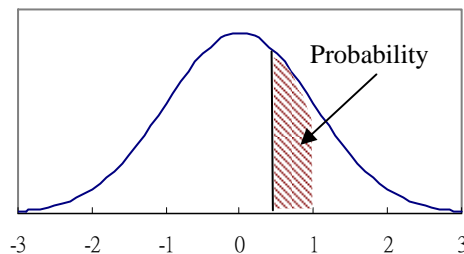


Table 1 Standard Normal Distribution

	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.7	0.2580	0.2611	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	0.2995	0.3023	0.3051	0.3078	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
1.00	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.10	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.20	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.30	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.40	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.50	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.60	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.70	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.80	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.90	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.00	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.10	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.20	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.30	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.40	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936