國立政治大學 113 學年度 學士班轉學生 招生考試試題

考試科目	經濟學A	系所別	經濟學系 二年級	考試時間	7月3日(三)第二節

1. (20%) Is a subsidy to potato farmers efficient? Use graphs to illustrate the change in total surplus after a subsidy, and to derive the deadweight loss.

2. (30%) Use graphs to illustrate the profit-maximizing output, price, and economic profit of firms in long-run equilibrium for each of the following market structures: (1) perfect competition, (2) monopoly, and (3) monopolistic competition.

3. (25%) Assume that the economy is initially at full employment and that neither the money wage rate nor the price level is sticky. Use the AS-AD model to explain how an increase in the quantity of money affects real GDP and price levels in the short and long run?

4. (25%) Derive a demand curve from a consumer's budget line and indifference curves.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

國立政治大學 113 學年度 學士班轉學生 招生考試試題

考試科目	微積分	系所別	經濟系、國貿系、統計系、資管系、風管系（二年級）	考試時間	7月 3日(三) 第四節

A.

Question 1: [5pts] Evaluate

$$\int_0^2 \frac{dx}{(x^2+4)^2}$$

by making the substitution $x = 2\tan u$.

Question 2: [5pts] Starting at the point where $r = 1$, the point P moves counterclockwise along the polar curve $r = e^{\theta/2\pi}$, in such a way that the line segment OP makes one complete revolution. (Here O denotes the origin.) Sketch the curve, and find the total area swept out by OP as it makes the revolution.

Question 3: [10pts] Find all local maxima and minima of the function $f(x) = 2|x| - x^2 - 1$.

Question 4: [10pts] Suppose that $f'(x) = e^{x^2}$, and $f(0) = 10$. One can conclude from the mean value theorem that

$$A < f(1) < B$$

for which numbers A and B?

Question 5: [20pts] Students studying for an exam get x hours of sleep in the two days leading up to the exam, where x is the range $0 \le x \le a$. The number of students who got between x_1 and x_2 hours of sleep in given by

$$\int_{x_1}^{x_2} cx\,dx; 0 \le x_1 \le x_2 \le a$$

(a) [10pts] What fraction of the students got less than $a/2$ hours of sleep?

(b) [10pts] Their scores are proportional to the amount of sleep they got: $S(x) = 100(x/a)$. Find the (correctly weighted) average score in the class.

考試科目	微積分	系所別	經濟系、國貿系、統計系、資管系、風管系（二年級）	考試時間	7月 3日(三)第四節

B.

Problem 1 Prove or disprove the following statements:

1. (8%) If $\sum_{n=1}^{\infty} a_n = A$ and $\sum_{n=1}^{\infty} b_n = B$ are both convergent, then $\sum_{n=1}^{\infty} a_n b_n = AB$.

2. (8%) Suppose that $\lim_{n\to\infty} a_n = 0$ and $a_n > 0$ for all $n \in \mathbb{N}$. Then $\sum_{n=1}^{\infty} (-1)^{n+1} a_n$ is convergence.

3. (8%) The series $\sum_{n=3}^{\infty} \frac{1}{\sqrt{n}(\ln n)^2}$ is divergent.

Problem 2 (8%) Evaluate $\int\int_R (x+y)e^{x^2-y^2}\, dA$ where R is then rectangle enclosed by the lines $x - y = 0$, $x - y = 2$, $x + y = 0$ and $x + y = 3$.

Problem 3 (8%) Find the extreme value of $f(x, y) = e^{-xy}$ subject to $x^2 + 4y^2 \leq 1$

Problem 4 (10%) Find the sum of the series $\sum_{n=1}^{\infty} n^3 x^n$ for $|x| < 1$.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

國立政治大學 113 學年度 學士班轉學生 招生考試試題

考試科目	經濟學 B	系所別	經濟學系 三組	考試時間	7 月 3 日(三) 第二節

1.選擇題 (30%)：30 題單選題，每題 1 分

(1) Resource use is allocatively efficient when

A) we produce the goods with the highest opportunity cost.

B) we produce the goods with the lowest opportunity cost.

C) we cannot produce more goods and services.

D) we produce the amount of the different goods we value most highly.

(2) Jane produces only corn and cloth. Taking account of her preferences for corn and cloth

A) makes her production possibilities frontier straighter.

B) makes her production possibilities frontier steeper.

C) makes her production possibilities frontier flatter.

D) does not affect her production possibilities frontier.

(3) Every spring, motorists do more driving than during the winter months. Every spring, the price of gasoline increases and the motorists buy more gasoline. This experience suggests that the

A) "law of supply" does not always hold for necessities like gasoline.

B) "law of demand" does not always hold for necessities like gasoline.

C) laws of supply and demand are both contradicted for gasoline, though only during the spring driving season.

D) None of the above answers are correct.

(4) Suppose that the demand for corn is price inelastic. If a technological advance makes corn farms more productive, the equilibrium price of corn will _____ and the farmers' total revenue will _____.

A) rise; increase

B) rise; decrease

C) fall; increase

D) fall; decrease

(5) If the marginal cost of producing every quantity decreases, all the following occur EXCEPT

A) minimum supply price does not change.

B) the marginal social benefit of the last unit bought changes.

C) the consumer surplus increases.

D) the efficient quantity increases.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學 B	系所別	經濟學系 三年級	考試時間	7月 3日(三) 第二節

(6) Which of the following statements is TRUE about taxes?
A) Taxes always create more deadweight loss than do price ceilings and price floors.
B) Taxes decrease both consumer surplus and producer surplus while creating a deadweight loss.
C) Government revenue from a tax is always greater than the loss of producer surplus and consumer surplus.
D) Both answers A and C are correct.

(7) When prices fall, consumers pay less and have extra money to spend. This illustrates which of the following?
A) consumer effect
B) producer effect
C) substitution effect
D) income effect

(8) Goods that have elastic demands are those whose marginal utility
A) is negative.
B) is zero.
C) diminishes slowly.
D) diminishes rapidly.

(9) Molly buys only paperbacks and cups of coffee and maximizes her utility. When the price of a paperback is $8 and the price of a cup of coffee is $1, her marginal utility from paperbacks is 40 units. Her marginal utility from a cup of coffee is ___ and her total utility ___.
A) 20 units; 60 units
B) 40 units; 80 units
C) 5 units; cannot be determined from the information given
D) 320 units; cannot be determined from the information given

(10) One reason why firms replace markets for some activities is that firms
A) reduce the number of transactions required.
B) enable individuals to avoid a large portion of their taxes.
C) reduce the rate at which the product is wasted.
D) do not require team production.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學 B	系所別	經濟學系 三年級	考試時間	7 月 3 日(三) 第二節

(11) You observe the following production relationship: $F(aK, aL) > aF(K, L)$.
From this, you can conclude that
A) the total cost of production is falling
B) the marginal product of L and K are increasing
C) there are increasing returns to scale
D) you should expand production
E) C and D

(12) If total fixed cost increases, then the average total cost curve ___ and the marginal cost curve ___.
A) does not shift: shifts upward
B) shifts upward: shifts upward
C) does not shift: does not shift
D) shifts upward: does not shift

(13) If in the short run, a perfectly competitive firm is producing at an output where price is greater than the minimum of long run average cost
A) The firm will necessarily make a profit in the long run
B) The firm will necessarily make a profit in the short run
C) The firm will have to reduce its price in the long run
D) The firm will not cover its fixed costs
E) The firm will have exit in the long run

(14) A monopolist faces a downward-sloping demand curve because
A) its average revenue equals its marginal revenue
B) its supply curve is upward sloping
C) it sells typically to only one consumer
D) its demand curve is the market demand curve
E) demand is perfectly inelastic.

(15) Which of the following is NOT a possible gain to society from a monopoly?
A) The monopoly may create rent seeking.
B) The monopoly may achieve economies of scale.
C) The monopoly may achieve economies of scope.
D) The monopoly may induce innovation.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學 B	系所別	經濟學系 三年級	考試時間	7 月 3 日(三) 第二節

(16) A natural monopoly that charges the profit-maximizing price will produce ___ output than a ___.
A) a larger; natural monopoly regulated by an average cost pricing rule
B) a more efficient; perfectly competitive industry
C) the same; natural monopoly regulated by a marginal cost pricing rule
D) a smaller; natural monopoly regulated by a marginal cost pricing rule

(17) In the long run, a firm in a monopolistically competitive industry produces where its marginal cost
A) is less than its average cost.
B) equals its average cost.
C) exceeds its average cost.
D) equals its price.

(18) In monopolistic competition, each firm's marginal revenue lies ___ its demand curve because of ___.
A) below; barriers to entry
B) below; product differentiation
C) above; barriers to entry
D) above; product differentiation

(19) Oligopolies can end up looking like competitive markets if the number of firms is
A) small and they all cooperate
B) small and they do not cooperate
C) large and they all cooperate
D) large and they do not cooperate

(20) In a cartel, the incentive to cheat is significant because
A) each firm has an incentive to decrease its own output
B) each firm has an incentive to raise its price
C) each firm has an incentive to expand its output
D) each firm's marginal cost exceeds the price that the cartel sets
E) each firm has an incentive to deviate from the Nash equilibrium

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學B	系所別	經濟學系 三年級	考試時間	7月3日(三) 第二節

(21) The government provides public goods because
A) private markets are incapable of producing these types of goods
B) free-riders make it difficult for private markets to supply the socially optimal quantity
C) markets are always better off with some government oversight
D) external benefits will accrue to private producers

(22) Why does the production of public goods have to be financed by the government?
A) One person's consumption of a public good means it is not available for anyone else.
B) People are able to consume public goods without paying for them.
C) Private sector firms will charge a price significantly above cost for public goods.
D) The cost of producing public goods is higher in the private sector.

(23) Suppose that the government asks consumers to report their benefit of the public good, and the public good is provided if the sum of the reports is larger than the cost of provision. If the public good is provided, consumers pay taxes for the provision. Which of the following statement is true?
A) Consumers always have an incentive to report their true benefit if they like the public good.
B) Consumers have an incentive to report their true benefit if it is larger than the taxes they have to pay.
C) Consumers have an incentive to overstate or understate their true benefit, depending on their taxes.
D) The only possible outcome in this situation is that everybody understates their preferences to avoid paying taxes.

(24) According to the Coase theorem, part of what is needed for private transactions to be efficient is that property rights
A) must be defined, but it does not matter who owns the property.
B) must be defined, and it is crucial as to who owns the property.
C) need not be defined as long as there are no transactions costs present.
D) need to be defined by the government to avoid producers from exploiting high transactions costs.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學B	系所別	經濟學系 三年級	考試時間	7月3日(三) 第二節

(25) Consider two goods--one that generates external benefits and another that generates external costs. A competitive market economy would tend to produce too

A) much of both goods.

B) little of both goods.

C) much of the good that generates external benefits and too little of the good that generates external cost.

D) little of the good that generates external benefits and too much of the good that generates the external cost.

(26) Intel hired a consultant who found that the value of marginal product of Intel's workers decreased as more workers were hired. Suppose Intel is a monopolistically competitive firm. Then the value of marginal product decreases because the

I. workers' marginal product of labor decreased as more workers were hired.

II. marginal revenue of Intel's chips decreased as more chips were sold.

A) I only

B) II only

C) Both I and II

D) Neither I nor II

(27) As the wage rate rises, the income effect influences workers to choose _____ leisure, and the substitution effect influences workers to choose _____ leisure.

A) more; less

B) more; more

C) less; less

D) less; more

(28) A country opens up to trade and becomes an exporter of wheat. In the wheat market, consumer surplus will _____, producer surplus will _____, and total surplus will _____.

A) decrease; increase; increase

B) increase; decrease; increase

C) decrease; increase; decrease

D) remain unchanged; increase; increase

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學 B	系所別	經濟學系 三年級	考試時間	7 月 3 日(三) 第二節

(29) If the United States imposes a tariff on imported steel, the tariff will
A) raise the domestic price of imported steel.
B) decrease the domestic production of steel.
C) increase the total domestic consumption of steel.
D) decrease domestic employment in the steel industry.

(30) In a consumer product Edgeworth box, a position on the contract curve
A) is always preferred by consumers to some position off the contract curve.
B) is always more fair than some other position somewhere off the contract curve.
C) is always Pareto optimal
D) is always defined where $MRS_A = MRS_B$
E) is described by none of the above

2. 是非題 (20%)：4 題，每題 5 分。針對每一題的陳述，回答是正確、錯誤，還是不一定。僅答正確、錯誤或不一定而無解釋者，不給分。

a. In an oligopolistic market with identical firms, the market price is higher when there are two firms in the market than when there are 100 firms in the market.
b. A risk neutral person will choose the outcome with the highest expected value.
c. A life insurance company must be concerned about the possibility that the people who buy life insurance may tend to be less healthy than those who do not. This is an example of adverse selection.
d. An insurance company must be concerned about the possibility that someone will buy fire insurance on a building and then set fire to it. This is an example of moral hazard.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學 B	系所別	經濟學系 三年級	考試時間	7 月 3 日(三) 第二節

3. Each of the following statements is true, false, or uncertain? Please explain. [**No explanation, no points awarded.**] (25 分)
   (1) In the Solow model, an increase in the saving rate will always increases per capita consumption in the steady state.
   (2) Other things being equal, the multiplier of government spending is larger in the closed economy than in an open economy.
   (3) Other things being fixed, an increase in the number of discourage workers will decrease the unemployment rate.
   (4) In the short run that the price levels of domestic and foreign countries are constant, an appreciation of domestic currency will always decrease the net export of the domestic country.
   (5) In any period, the real exchange rate between two countries must move in the same direction as their nominal exchange rate.

4. Answer the following questions.
   (1) Taiwan's excess savings have hit new highs in recent years. Please derive the relationship between excess savings and current account. Based on your derivation, explain how can Taiwan reduce its excess savings. Explain clearly your suggestions. [Hint: do not simply say that Taiwan should reduce its savings or increase its investment. **Please be specific about the policy you suggest.**] (10 分)
   (2) What is the yield curve? Under what situation, the yield curve may be inverted? (6 分)
   (3) What is the zero lower bound? If a country's interest rate reaches its zero lower bound, how can the central bank stimulate investment? Explain carefully. [Indicate at least two policies.] (9 分)

The End.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	統計學	系所別	經濟學系三年級	考試時間	7 月 3 日(三) 第四節

Please note that: In the following,

- Numbers other than probabilities should be rounded to two decimal places. Probabilities should be rounded to three decimal places.

I. (15%) Consider a sorted list of a random sample of size n=15: 0, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 6.

(1). (3%) Give a statistical measure to describe the central tendency of the data.

(2). (3%) Provide a statistical measure to describe the dispersion of the data.

(3). (3%) Is the data positively skewed? Explain your reasoning.

(4). (3%) Are there any outliers in the data? State the criterion used.

(5). (3%) Construct a box-plot to illustrate the distribution of the data.

II. (25%) Assume last month the price per box of eggs followed a Normal distribution with mean NT$60 and standard deviation NT$15. To validate the price this month, the prices of 16 boxes of eggs randomly selected from local markets are investigated.

(1). (3%) If the price remains the same, what is the sampling distribution of the sample mean $\bar{X}$?

(2). (5%) Suppose from a dataset, $\bar{x} = 65$. To test whether the price has increased this month, find the p-value and draw a conclusion at significance level 5%.

(3). (6%) Please explain the difference between the Type I error rate, significance level, and p-value.

(4). (6%) Let Y=no. of boxes of eggs which price is greater than 60 in the sample. If the price remains the same, find the sampling distribution of Y and its expectation.

(5). (5%) How do you validate the assumption that the population distribution is Normal from the data?

III. (20%) To compare the current price per box of eggs in four cities, we collected a random sample of 16 boxes of eggs. The overall sample mean price is NT$ 65, with a standard deviation of NT$20. The following table provides the sample mean price and sample size for each city:

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City	A	B	C	D
$\bar{x}$	53	55	72	80
n	4	4	4	4

Compute the ANOVA table and determine whether the average egg prices in the 4 cities differ at significance level 5%.

IV. (25%) Consider a regression model for the price of a box of eggs based on two predictors: eggs weight and egg type. Suppose a random sample of size 50 is obtained. The following are the variable descriptions and data ranges:

price = price of a box of eggs in NTD, ranging from 90 to 120;

weight = weight of a box of eggs in grams, ranging from 560 to 610;

type = egg type, either Organic or Nonorganic.

Further, the outputs of some statistical software are given below.

```
Coefficients:
             Estimate   Std. Error  t value   Pr(>|t|)
(Intercept) 69.61194    20.26251    3.436     0.00125 **
weight       0.04877     0.03457    1.411     0.16494
typeOrganic 17.15845     1.66298   10.318     1.16e-13 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 3.515 on 47 degrees of freedom
Multiple R-squared:  0.6943,        Adjusted R-squared:  0.6813
F-statistic: 53.37 on 2 and 47 DF,  p-value: 8.031e-13
```

(1). (10%) What is the prediction equation? Interpret the regression coefficients.

(2). (3%) Interpret the residual standard error. First, provide the definition. Next, explain what a large value indicates.

(3). (3%) Interpret the adjusted R-squared. First, provide the definition. Next, explain what a large value indicates.

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(4). (3%) What null hypothesis does the F-statistic test against? Does it achieve statistical significance at the 5% level?

(5). (3%) In a regression analysis, what are residual plots used to check the condition of? Please gives 3 examples.

(6). (3%) What is multi-collinearity? How to detect a severe multi-collinearity?

V. (15%) Suppose we bought a random sample of 100 boxes of eggs of 4 major brands: A, B, C, D from local stores. Among them, 30 boxes are of brand A; 25 are of brand B; 25 are of brand C; and 20 are of brand D. It's known that the market shares of these brands are A:B:C:D=7:5:7:6. At a significance level of 5%, can we conclude that the sample is not representative of the overall population?

Appendix:

Table 1. Cumulative distribution function P(Z<z) of N(0,1).

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
0.1	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
0.2	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
0.3	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
0.4	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
0.5	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
0.6	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
0.7	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
0.8	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
0.9	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
1.0	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
1.1	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
1.2	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
1.3	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
1.4	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
1.5	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
1.6	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
1.7	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
1.8	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
1.9	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
2.0	.97725	.97778	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
2.1	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
2.2	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899

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Table 2. Given df and α, the 100(1-α)th percentile of t-distribution, i.e. $t_{\alpha,df}$ *s.t.* $P(T > t_{\alpha,df}) = \alpha$

df	Upper Tail Probability: Pr($T > t$)									
	0.2	0.1	0.05	0.04	0.03	0.025	0.02	0.01	0.005	0.0005
1	1.376	3.078	6.314	7.916	10.579	12.706	15.895	31.821	63.657	636.619
2	1.061	1.886	2.920	3.320	3.896	4.303	4.849	6.965	9.925	31.599
3	0.978	1.638	2.353	2.605	2.951	3.182	3.482	4.541	5.841	12.924
4	0.941	1.533	2.132	2.333	2.601	2.776	2.999	3.747	4.604	8.610
5	0.920	1.476	2.015	2.191	2.422	2.571	2.757	3.365	4.032	6.869
6	0.906	1.440	1.943	2.104	2.313	2.447	2.612	3.143	3.707	5.959
7	0.896	1.415	1.895	2.046	2.241	2.365	2.517	2.998	3.499	5.408
8	0.889	1.397	1.860	2.004	2.189	2.306	2.449	2.896	3.355	5.041
9	0.883	1.383	1.833	1.973	2.150	2.262	2.398	2.821	3.250	4.781
10	0.879	1.372	1.812	1.948	2.120	2.228	2.359	2.764	3.169	4.587
11	0.876	1.363	1.796	1.928	2.096	2.201	2.328	2.718	3.106	4.437
12	0.873	1.356	1.782	1.912	2.076	2.179	2.303	2.681	3.055	4.318
13	0.870	1.350	1.771	1.899	2.060	2.160	2.282	2.650	3.012	4.221
14	0.868	1.345	1.761	1.887	2.046	2.145	2.264	2.624	2.977	4.140
15	0.866	1.341	1.753	1.878	2.031	2.131	2.249	2.602	2.947	4.073

Table 3. Given $df1, df2$ and α, the 95th percentile of F-distribution, i.e. $P(F > F_{0.05,df\ ,df}) = 0.05$

Denominator degrees of freedom	Numerator degrees of freedom												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	243.9	245.9	248.0
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56
6	6.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33

考試科目	統計學	系所別	經濟學系三年級	考試時間	7 月 3 日(三) 第四節

Table 4. Given df and α, the 100(1-α)th percentile of Chi-square distribution, i.e. $\chi^2_{\alpha,df}$ *s.t.* $P(\chi^2 > \chi^2_{\alpha,df}) = \alpha$

Degrees of freedom	Probability (alpha) that the tabulated value is exceeded			
	0.10	**0.05**	**0.01**	**0.001**
1	2.71	**3.84**	6.63	**10.83**
2	4.61	5.99	9.21	13.82
3	6.25	7.81	11.34	16.27
4	7.78	9.49	13.28	18.47
5	9.24	11.07	15.09	20.52
6	10.64	12.59	16.81	22.46
7	12.02	14.07	18.48	24.32
8	13.36	15.51	20.09	26.13
9	14.68	16.92	21.67	27.88

Reference: Distribution tables
https://www.math.arizona.edu/~rsims/ma464/standardnormaltable.pdf; https://www.stat.purdue.edu/~lfindsen/stat503/t-Dist.pdf; https://faculty.washington.edu/heagerty/Books/Biostatistics/TABLES/F-Tables/;
https://www.researchgate.net/figure/Chi-squared-distribution-table_tbl5_343365665.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。