考試科目	經濟學	系所別	商學院共同科	考試時間	2月 6日(二)第二節

Multiple Choice (1 point each)

Identify the letter of the choice that best completes the statement or answers the question.

1. A consumer's utility function is $U(x, y, z) = 5y + \min\{x, 2z\}$. Now, at $p_x = 1, p_y = 5$, and $p_z = 2$, which of the following descriptions is correct as p_z marginally decreases.
   A. The income effect increases the consumption of y.
   B. There is no substitution effect.
   C. There is no income effect.
   D. The substitution effect increases the consumption of z.

2. Suppose a consumer with a monotonic preference consumes only two goods. Then,
   A. both goods need to be normal goods.
   B. two goods are substitutes for each other.
   C. if she has a downward sloping demand on one good, so as on another good.
   D. None of the above is correct.

3. Ann's preferences can be represented by the utility function $U(x, y) = (x - 3)^2 + (y - 4)^2$, then which of following is correct?
   A. Her preference is convex.
   B. Her preference is monotonic.
   C. Commodity x is a "bad" for Ann.
   D. If Ann has 10 dollars and $p_x = p_y = 1$, then Ann will consume $x = y = 5$.

4. Consider a monopolistic competition market with a limited number of licenses that can be traded. In the long run, which of the following statements is incorrect?
   A. All firms in the market earn zero profit.
   B. Some firms have incentives to sell their licenses.
   C. The potential entry firms will be indifferent between entering the market or not.
   D. All firms produce at a quantity with decreasing average cost.

5. Consider a market with demand, $Q_D = 200 - 5P$ and supply, $Q_S = 5P - 75$. The production process causes pollution for the environment as a negative external cost per unit is represented as $E_C = Q_S/5 + 10$. If the government plans to levy a Pigouvian ad valorem tax, which of the following is the correct tax rate?
   A. 45%
   B. 66%
   C. 75%
   D. 100%

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	系所別	商學院共同科	考試時間	2月6日(二)第二節

6. What is the producer surplus of the monopoly when it conducts perfect price discrimination, given the demand function and marginal cost as $Q = 10 - P$ and $MC = 5$, respectively?

A. 3.125
B. 6.25
C. 12.5
D. 25

7. Among the following total cost functions of firms in a perfectly competitive market, which one has a meaningful shutdown point ($Q_{shutdown} > 0$)?

A. $5Q^3 + 20Q^2 + 50Q + 100$
B. $5Q^3 - 20Q^2 + 50Q + 100$
C. $5Q^3 + 20Q^2 + 50Q - 400$
D. $5Q^3 + 2Q^2 - 100Q + 100$

8. The long-run total cost function of a firm in a monopolistic competitive market is $TC(Q) = 7700Q - 100Q^2 + 1/3Q^3$. Which of the following represents a possible long-run equilibrium price and output?

A. $(P, Q) = (100, 100)$
B. $(P, Q) = (200, 150)$
C. $(P, Q) = (500, 120)$
D. $(P, Q) = (500, 180)$

9.

		Player 2		
		A	B	C
Player 1	A	(1,2)	(2,1)	(1,0)
	B	(0,5)	(1,2)	(7,4)
	C	(-1,1)	(3,X)	(2,2)

Which of the following values of X yields the above game exactly two pure strategy Nash equilibria?

A. 0
B. 1
C. 1.5
D. 3

10. Suppose a market has the following well-defined market supply curve: $Q = P + 3$. The market structure of this market could be:

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	系所別	商學院共同科	考試時間	2月6日(二)第二節

(i) Perfect competition.
(ii) Monopolistic competition.
(iii) Monopoly.
(iv) Oligopoly.

A. (i) only
B. (ii) and (iii)
C. (ii), (iii), and (iv)
D. (i), (ii), (iii), and (iv)

11. Suppose Iran has a comparative advantage over other countries in producing pistachios, but other countries have an absolute advantage over Iran in producing pistachios. If trade in pistachios is allowed, Iran

A. will import pistachios.
B. will export pistachios.
C. will have nothing to gain either from exporting or importing pistachios.
D. will either import or export pistachios, but it is not clear from the given information.

12. In the Unites States, the CPI was 100 in 1983 and is 250 in 2018, then $100 in 2018 purchases the same amount of goods and services as

A. $25 purchased in 1983.
B. $40 purchased in 1983.
C. $100 purchased in 1983.
D. $250 purchased in 1983.

13. Seeing a looming credit crunch, banks choose to hold more excess reserves relative to their deposits. This action

A. does not change the money multiplier, but increase the money supply.
B. does not change the money multiplier, but decrease the money supply.
C. increases the money multiplier, and increase the money supply.
D. decreases the money multiplier, and decrease the money supply. .

14. Suppose the inflation rate is high, but unemployment is at its natural rate. If the central bank pursues a contractionary monetary policy, which of the following results would be expected in the short run?

A. The short-run Phillips curve would shift to the left.
B. The short-run Phillips curve would shift to the right.
C. The economy would move up and to the left along a given short-run Phillips curve.
D. The economy would move down and to the right along a given short-run Phillips curve.

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	系所別	商學院共同科	考試時間	2月 6日(二) 第 二節

15. Which of the following would transfer wealth from old to young?
A. Increases in the budget deficit
B. Increases in housing prices
C. More generous education subsidies
D. Indexation of Social Security benefits to inflation

16. Which of the following results in higher inflation and higher unemployment in the short run?
A. The Fed institutes an interest rate cut.
B. The Fed raises interest rates.
C. The price of oil increases.
D. All of the above.

17. Other things being equal, as the price level of a country increases,
A. its real value of money falls and its currency appreciates.
B. its real value of money rises and its currency appreciates.
C. its real value of money falls and its currency depreciates.
D. its real value of money rises and its currency depreciates.

18. Which of the following shifts both the long-run aggregate supply curve and the short-run aggregate supply curve?
A. a change in the price level
B. a change in the money wage rate
C. an advance in technology
D. All of the above.

19. If the price level is constant and the slope of the aggregate expenditure curve in the Keynesian model is 0.75, a decrease in investment of $100 leads to a(n) _____ in real GDP of _____.
A. decrease; $75.
B. increase; $75.
C. increase; $400.
D. decrease; $400.

20. Suppose the economy is experiencing an unanticipated event. Real borrowing costs rise for debtors due to the occurrence of this event. What kind of event might it be and what kind of action could the Fed take to help the debtors?
A. An unexpected fall in price; increase the money supply.
B. An unexpected fall in price; decrease the money supply.
C. An unexpected rise in price; decrease the money supply.
D. An unexpected rise in price; increase the money supply.

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	系所別	商學院共同科	考試時間	2月6日(二)第二節

Problems and Short-essay Questions

1. David consumes two goods: pencils (x_1) and erasers (x_2). The price of a pencil is P_1 while the price for an eraser is P_2. David has m dollars. David's utility function is

$$u(x_1, x_2) = \min\{6x_1 + x_2, x_1 + 2x_2\}.$$

a. (7 points) Calculate the marginal rate of substitution ($\frac{dx_2}{dx_1}$) for David.

b. (7 points) What are David's demand functions in terms of P_1, P_2, and m.

c. (6 points) Suppose $P_1 = 2, P_2 = 4$, and $m = 40$. Moreover, if one buys 10 pencils or more, he will get 5 erasers for free. What is David's optimal choice now?

2. A perfectly competitive market in a small country has 50 identical firms. Suppose the market demand function is $P = 130 - Q$ and the supply curve of a firm is $P = -50 + 50q$, where P is the market price, Q is the market quantity supplied, and q is a firm's quantity supplied. Please answer the following questions in detail:

a. (5 points) What is the market supply curve?

b. (5 points) What is the market equilibrium under autarky?

c. (10 points) Suppose the world price of the market product is 30, and the small country is currently under free trade. What level of import tariff should the government impose to make consumer surplus equal to 4512.5?

3. Below are some data from the land of milk and honey.

Year	Price of Milk	Quantity of Milk	Price of Honey	Quantity of Honey
2020	7	10	2	15
2021	5	17	5	3
2022	4	30	6	6

a. (6 points) Compute the percentage change in nominal GDP between 2020 and 2022.

b. (8 points) Suppose the government adopts the fixed-based approach to measure the real GDP by setting 2020 as the base year. What is the cumulative real GDP growth rate between 2020 and 2022?

c. (6 points) Suppose the government adopts the chain-linked approach to measure the real GDP. What is the cumulative real GDP growth rate between 2020 and 2022?

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	系所別	商學院共同科	考試時間	2 月 6 日(二) 第 二 節

4. Suppose the nominal exchange rate between the dollar and the euro is 2 euros per dollar. Answer the following questions.

a. (5 points) The price of a book in Europe is 20 euros. If the purchasing power parity holds, how much will the same book cost in the United States?

b. (10 points) If the price level in the U.S. is 120 and the price level in Europe is 150, what is the real exchange rate in terms of European goods per U.S. good? By how much is the Euro undervalued or overvalued than predicted by the purchasing-power parity?

c. (5 points) If the nominal exchange rate between the dollar and the euro becomes 1.5 euros per dollar, what will happen to U.S. net capital outflow?

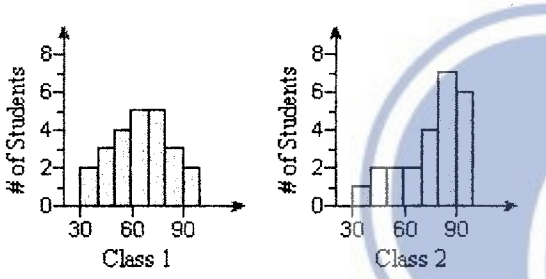
備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第四節

第一大題(3pt for each, please write down the item numbers and answers in order. For example: 1 (d) 2 (d) 3(d)..... 10 (d))

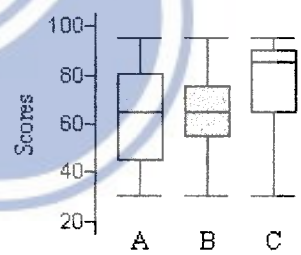
1. An assumption made about the value of a population parameter is called a
(a) sampling distribution
(b) hypothesis
(c) confidence interval
(d) significance

The next two questions will be based on the following
Three statistics classes all took the same test and the histograms of the test scores are shown to the right



2. Overall, which class has the highest mean and median? Check one that apply
(a) Class 1 (b) Class 2 (c) Class 3

3. Match each class with the corresponding boxplot
Class 1 corresponds to boxplot _____.
Class 2 corresponds to boxplot _____.
Class 3 corresponds to boxplot _____.
(a) ABC (b) ACB (c) BCA (d) BAC



4. We test the null hypothesis H_0: $\mu = 10$ and the alternative H_a: $\mu < 10$, for a normal population with $\sigma = 4$. A random sample of 16 observations is drawn from the population and we find the sample mean of these observations is 12. The p-value is closest to
(a) 0.0228
(b) 0.0456
(c) 0.1016
(d) 0.9772

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第四節

5. A certain population follows a normal distribution with mean μ and standard deviation $\sigma = 2.5$. You collect data and test the hypotheses H_0: μ = 1, H_a: μ≠ 1.
You obtain a *p*-value of 0.022. Which of the following is true?
(a) a 90% confidence interval for μ will include the value 1
(b) a 95% confidence interval for μ will include the value 1
(c) a 97% confidence interval for μ will include the value 1
(d) a 99% confidence interval for μ will include the value 1

6. The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. Using the 68-95-99.7 rule, what percent of students will complete the exam in under an hour?
(a) 68%
(b) 32%
(c) 16%
(d) 5%

7. Which of the following is true?
(a) if we draw a simple random sample of any size from any population the sampling distribution of the sample mean will be **exactly** Normal
(b) if we draw a simple random sample of any size from any population the sampling distribution of the sample mean will be **close** to Normal
(c) central limit theorem only applies when sampling from Normal populations
(d) none of the above

8. If two random samples of sizes 30 and 36 are selected independently from two populations with means 78 and 85, and standard deviations 12 and 15, respectively, then the standard error of $\bar{X}_1 - \bar{X}_2$ is equal to:
(a) 0.904
(b) 3.324
(c) 3.391
(d) 0.833

9. A student took a math test whose mean was 70 and standard deviation was 5. The total points possible was 100. Suppose that the exam is normally distributed. Stacey's results were reported to be at the 95th percentile. What was his actual exam score, rounded to the nearest whole number?
(a) 80
(b) 75
(c) 78
(d) 62

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第四節

10. Consider the following model $Y = \beta_0 + \beta_1 x + \varepsilon$, whether Y is the daily rate of return of a stock, and x is the daily rate of return of the stock market as a whole, measured by the daily rate of return of Standard & Poor's(S&P) 500 Composite Index. Using a random sample of $n = 12$ days from 1980, the least squares lines shown in the table below were obtained for four firms. The estimated standard error of $\hat{\beta}_1$ is shown to the right of each least squares prediction equation

Firm	Estimated Market Model	Estimated Standard Error of $\hat{\beta}_1$
Company A	y= 0.0010-1.40x	0.30
Company B	y= 0.0005-1.21x	0.60
Company C	y= 0.0010+1.62x	1.34
Company D	y= 0.0013+0.76x	0.15

For which of the stocks is there evidence (at $\alpha = 0.05$) of a positive linear relationship between Y and x?

(a) Company D only

(b) Company C and D only

(c) Companies A, B and D

(d) Companies B and D only

第二大題(15%)

7 pairs of twin male lambs were selected; diet plan I was given to one twin and diet plan II to the other twin in each case. The weights at eight months were as follows.

	1	2	3	4	5	6	7
Diet I	111	102	90	110	108	125	99
Diet II	97	90	96	95	110	107	85

a. (7pt) Someone use the two-sample t-test to test the hypothesis that there is no difference in the diets against the alternative that diet I is preferable to diet II at $\alpha = 0.10$. Please show the test statistic and its p-value

b. (8pt) Does this testing convince you? Explain. Can you find other testing procedure which is better than the two-sample t-test? Ps., your answers should have some statistical analysis to support your arguments.

第三大題(15%)

There are 5 urns. The r-th urn contains $(r-1)$ red balls and $(5-r)$ blue balls, for $r = 1, 2, \ldots, 5$. You randomly pick one urn and chose two balls without replacement.

a. (12pt) Find the probability that the second ball is blue

b. (3pt) Find the probability that the second ball is blue, given the first one is blue

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第四節

第四大題(20%)

Suppose that two shipping companies, A and B, each decide to estimate the annual percentage of shipments on which a $100 or greater claim for loss or damage was filed by sampling their records, and they report the data shown below.

	Company A	Company B
Total shipments sampled	800	600
Number of shipments with a claim ≥ $100	200	100

The owner of Company B is hoping to use these data to show that her company is superior to Company A with regard to the percentage of claims filed. Let $\alpha = 0.05$

a. (10pt) Conduct a two-sample test procedure to analyze the data in this experiment

b. (10pt) Conduct another testing based on the Chi-square test statistic

第五大題(20%)

A random sample of 30 executives from companies with assets over $1 million was selected and asked for their annual income and level of education. The following table summarized the results

	High School or less	Undergraduate Degree	Master's Degree or More
Sample size	7	11	12
Average Salary (1,000s)	49	76.3	78.3

a. (4pt) Find H_0 and H_a

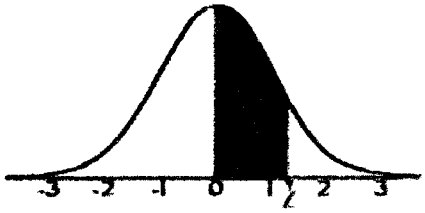
b. (6pt) Given the mean square error (MSE) was 243.7. Please construct a ANOVA table

c. (5pt) Compute the test statistic and test the hypotheses at a 5% level of significance.

d. (5pt) The difference of salaries between undergraduate and master's degree or more is of interest. Find a 95% confidence interval for the difference

表格附錄(t, z, χ^2, F table)

考試科目	統計學	系所別	企業管理研究所(MBA 學位學程)甲組一般生	考試時間	2 月 6 日(二)第 四 節

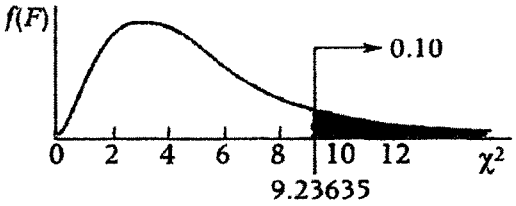


STANDARD NORMAL TABLE (Z)

Entries in the table give the area under the curve between the mean and *z* standard deviations above the mean. For example, for $z = 1.25$ the area under the curve between the mean (0) and z is 0.3944.

	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
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	0.2969	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
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3513	0.3554	0.3577	0.3529	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4606	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第1節



Example: df (Number of degrees of freedom) = 5, the tail above $\chi^2 = 9.23635$ represents 0.10 or 10% of the area under the curve.

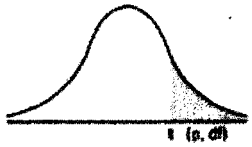
Degrees of Freedom	Area in Upper Tail .995	.99	.975	.95	.9	.1	.05	.025	.01	.005
1	0.0000393	0.0001571	0.0009821	0.0039322	0.0157907	2.7055	3.8415	5.0239	6.6349	7.8794
2	0.010025	0.020100	0.050636	0.102586	0.210721	4.6052	5.9915	7.3778	9.2104	10.5965
3	0.07172	0.11483	0.21579	0.35185	0.58438	6.2514	7.8147	9.3484	11.3449	12.8381
4	0.20698	0.29711	0.48442	0.71072	1.06362	7.7794	9.4877	11.1433	13.2767	14.8602
5	0.41175	0.55430	0.83121	1.14548	1.61031	9.2363	11.0705	12.8325	15.0863	16.7496
6	0.67573	0.87208	1.23734	1.63538	2.20413	10.6446	12.5916	14.4494	16.8119	18.5475

Table III: F table with $\alpha = 0.05$

Denominator DF	Numerator DF 1	2	3	4	5	6	7	8	9	10
1	161.448	199.500	215.707	224.583	230.162	233.986	236.768	238.883	240.543	241.882
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.786
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637
8	5.318	4.459	4.066	3.838	3.687	3.581	3.500	3.438	3.388	3.347
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671
14	4.600	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641	2.588	2.544
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548	2.494	2.450
18	4.414	3.555	3.160	2.928	2.773	2.661	2.577	2.510	2.456	2.412
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477	2.423	2.378
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348
21	4.325	3.467	3.072	2.840	2.685	2.573	2.488	2.420	2.366	2.321
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297
23	4.279	3.422	3.028	2.796	2.640	2.528	2.442	2.375	2.320	2.275
24	4.260	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.300	2.255
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337	2.282	2.236
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.265	2.220
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305	2.250	2.204
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.190
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266	2.211	2.165

考試科目	統計學	系所別	企業管理研究所(MBA學位學程)甲組一般生	考試時間	2月6日(二)第四節

t table



df/p	0.40	0.25	0.10	0.05	0.025	0.01	0.005	0.0005
1	0.324920	1.000000	3.077684	6.313752	12.70620	31.82052	63.65674	636.6192
2	0.288675	0.816497	1.885618	2.919986	4.30265	6.96456	9.92484	31.5991
3	0.276671	0.764892	1.637744	2.353363	3.18245	4.54070	5.84091	12.9240
4	0.270722	0.740697	1.533206	2.131847	2.77645	3.74695	4.60409	8.6103
5	0.267181	0.726687	1.475884	2.015048	2.57058	3.36493	4.03214	6.8688
6	0.264835	0.717558	1.439756	1.943180	2.44691	3.14267	3.70743	5.9588
7	0.263167	0.711142	1.414924	1.894579	2.36462	2.99795	3.49948	5.4079
8	0.261921	0.706387	1.396815	1.859548	2.30600	2.89646	3.35539	5.0413
9	0.260955	0.702722	1.383029	1.833113	2.26216	2.82144	3.24984	4.7809
10	0.260185	0.699812	1.372184	1.812461	2.22814	2.76377	3.16927	4.5869
11	0.259556	0.697445	1.363430	1.795885	2.20099	2.71808	3.10581	4.4370
12	0.259033	0.695483	1.356217	1.782288	2.17881	2.68100	3.05454	43178
13	0.258591	0.693829	1.350171	1.770933	2.16037	2.65031	3.01228	4.2208
14	0.258213	0.692417	1.345030	1.761310	2.14479	2.62449	2.97684	4.1405
15	0.257885	0.691197	1.340606	1.753050	2.13145	2.60248	2.94671	4.0728

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　碩士班暨碩士在職專班 招生考試試題

考試科目	管理學	系所別	企業管理研究所 (MBA 學位學程)	考試時間	2月6日(二)第四節

1. 管理者最為關鍵的責任之一在於塑造組織文化。請問：
   a. 何謂組織文化？(10%)
   b. 請定義強勢文化與弱勢文化，並比較兩者之不同之處。(15%)

2. 管理者最為重要任務之一是推動組織變革，然而，變革往往伴隨著對組織內部的巨大改變。
   a. 請使用 Kurt Lewin 的變革三步驟理論解釋變革過程。(10%)
   b. 組織成員通常對變革產生抗拒。請列舉管理者可採取的三種方法以減緩成員的抗拒，並探討各方法的優缺點。(15%)

3. 台積電創辦人張忠謀先生曾表示雙首長制接班團隊的制度形成，是給台積電的一個禮物。2023 年 12 月台積電宣布劉德音董事長將於 2024 年股東會後退休，象徵由劉德音董事長與魏哲家副董事長兼總裁的「雙首長制」告一段落。事實上，許多企業如 Intel、Microsoft 亦曾於不同時間點採行過類似的雙首長制。
   a. 請透過組織設計的觀點，說明企業的雙首長制可能有什麼優點與缺點？(16%)
   b. 企業雙首長制度能夠運作良好的具體關鍵考量為何？(10%)

4. 彼得杜拉克（Peter Drucker）曾指出「有效率的管理者不開無效的會議」。若您是一位管理者，請從規劃、組織、領導、控制各面向說明，將如何避免無效會議的發生？(24%)

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	微積分	系所別	企業管理研究所(乙組)	考試時間	2月 6日(二) 第 四 節

Show all your work to earn the credits.

1. Evaluate the following limits:

   (a) (10 points) $\lim_{x\to 1}\left[(x-1)^2 \sin\left(\frac{2}{x-1}\right)\right]$

   (b) (10 points) $\lim_{n\to\infty}\frac{1}{n}\left[\left(\frac{1}{n}\right)^2+\left(\frac{2}{n}\right)^2+\cdots+\left(\frac{n-1}{n}\right)^2\right]$

2. Evaluate the following:

   (a) (10 points) $\frac{d}{dx}\int_{-\ln x}^{\ln x}\sin(e^t)dt$

   (b) (10 points) $\frac{d}{dx}[\cos(2x)]^{\sin(3x)}$

3. Evaluate each of the following integrals:

   (a) (10 points) $\int\frac{1}{(x^2+1)^2}dx$

   (b) (10 points) $\int\frac{3}{1+e^{-3x}}dx$

4. (10 points) Determine whether the following series

$$\sum_{n=2}^{\infty}(-1)^n \ln\left(\frac{n+1}{n}\right)$$

   is conditionally convergent, absolutely convergent or divergent. Show your work and state which test you use.

5. Given the power series

$$f(x)=\sum_{n=1}^{\infty}\frac{(-1)^{n-1}(x-1)^n}{n}$$

   (a) (4 points) Find all the values of x at which the power series converges.

   (b) (3 points) Find the eighth-order derivative $f^{(8)}(1)$ at $x=1$.

   (c) (3 points) Evaluate the sum of the alternating harmonic series:

$$1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}+\cdots.$$

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	微積分	系所別	企業管理研究所(乙組)	考試時間	2月6日(二) 第四節

6. A retailer has been selling 1200 tablet computers a week at \$350 each. The marketing department estimates that an additional 80 tablets will sell each week for every \$10 that the price is lowered. Let x be the number of tablets sold.

   (a) (2 points) Find the demand function.

   (b) (3 points) What should the price be set at in order to maximize revenue?

   (c) (3 points) If the retailer's weekly cost function is

   $$C(x) = 35,000 + 120x$$

   What is the marginal profit function?

   (d) (2 points) What additional profit is realized if the sale of tablets is increased from 1200 to 1201 per week?

7. The quantity x demanded each week is related to the unit price p by the demand equation

   $$x = \sqrt{169 - p^2}, \quad 0 \le p \le 13.$$

   (a) (4 points) Find the price elasticity of demand that corresponds to $p = 5$.

   (b) (2 points) Is the demand elastic or inelastic when $p = 5$?

   (c) (2 points) For what price p is the demand unitary?

   (d) (2 points) If the unit price is increased slightly from 5, will the revenue increase or decrease?

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。