招生學年度	九十九	招生類別	碩士班
系所班別	企業管理學系碩士班、國際企業學系碩士班、運籌管理研究所碩士班、財務金融學系碩士班		
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(16)

Multiple Choice: 25 questions, 4 points each.

1. Let $\{E_1, E_2, E_3, E_4, E_5\}$ be a partition of the sample space S. If $P(E_1) = P(E_2) = 0.15$, $P(E_3) = 0.4$, and $P(E_4) = P(E_5)$. Find the probabilities of E_4.

(1) 0.01 (2) 0.05
(3) 0.15 (4) 0.45

2. Two events A and B are said to be independent. Which one does not hold?

(1) $P(A \mid B) = P(A)$ (2) $P(A \cup B) = P(A) + P(B)$
(3) $P(B \mid A) = P(B)$ (4) $P(A \cap B) = P(A)P(B)$

3. Two methods, A and B, are available for teaching a certain industrial skill. The failure rate is 20% for A and 10% for B. However, B is more expensive and hence is used only 30% of the time. A is used the other 70%. A worker was taught the skill by one of the methods but failed to learn it correctly. What is the probability that she was taught by method A?

(1) 14/17 (2) 3/17
(3) 3/14 (4) 11/14

4. An oil exploration firm is formed with enough capital to finance ten explorations. The probability of a particular exploration being successful is 0.1. Assume the explorations are independent. Suppose each successful exploration costs \$30,000 and each unsuccessful exploration costs \$15,000, find the expected total cost to the firm for its ten explorations.

(1) 165,000 (2) 285,000
(3) 150,000 (4) 450,000

5. Let Y denote an exponential random variable with mean 2. Find $P(Y > 4 \mid Y > 2)$.

(1) e^{-1} (2) e^{-2}
(3) e^{-4} (4) $1 - e^{-2}$

6. Let Y denote a random variable with moment-generating function $m(t) = \frac{1}{6}e^{t} + \frac{2}{6}e^{2t} + \frac{3}{6}e^{3t}$. Find $V(Y)$.

(1) 1 (2) 2/7
(3) 1/2 (4) 5/9

7. Let Y possess a density function

$$f(y) = \begin{cases} c(2-y), & 0 \le y \le 2 \\ 0, & \text{elsewhere.} \end{cases}$$

Find c.

(1) 1 (2) 2
(3) 0.5 (4) 4

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8. Let Y has a probability density function given by

$$f(y)=\begin{cases}4y^2e^{-2y}, & y>0\\ 0, & \text{elsewhere.}\end{cases}$$

Find $V(Y)$.

(1) 1/2　(2) 3/4

(3) 2/3　(4) 1

9. A random variable Y has the probability density function

$$f(y)=\begin{cases}e^{-y}, & y>0\\ 0, & \text{elsewhere.}\end{cases}$$

Find $E(e^{0.5Y})$.

(1) 1　(2) 1/2

(3) 0　(4) 2

10. Let the joint probability density function of Y_1 and Y_2 be

$$f(y_1,y_2)=\begin{cases}4y_1y_2, & 0\le y_1\le 1,\ 0\le y_2\le 1\\ 0, & \text{elsewhere.}\end{cases}$$

Find $P(Y_1\le\frac{1}{2}\,|\,Y_2\ge\frac{1}{4})$.

(1) 5/8　(2) 1/8

(3) 1/4　(4) 3/8

11. Assume that Y_1 and Y_2 are random variables, with $E(Y_1)=2$, $V(Y_1)=4$, $E(Y_2)=-1$, $V(Y_2)=6$, and $Cov(Y_1,Y_2)=1$. Find $V(Y_1-2Y_2)$.

(1) 28　(2) 24

(3) 16　(4) 3

12. Customers arrive at a department store checkout counter according to a Poisson distribution with a mean of 1 per minute. In a given 2-minute period, what is the probability that two or more customers will arrive at the counter?

(1) $2e^{-1}$　(2) $1-3e^{-1}$

(3) $1-e^{-2}$　(4) $1-3e^{-2}$

13. Refer to the following partial ANOVA results from Excel (some information is missing).

Source of Variation	*SS*	*df*	*MS*	*F*
Between Groups			210.2778	
Within Groups	1483		74.15	
Total	2113.833			

Degrees of freedom for the F-test are

(1) 5, 22　(2) 4, 21

(3) 3, 20　(4) Impossible to determine

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14. Which one of the following is not an assumption of one-way analysis of variance?

(1) Random selection of samples from each population

(2) Equality of the population variances

(3) Equality of the population means

(4) Samples selected from each treatment population all have normal distributions

15. A realtor is trying to predict the selling price of Houses in Greenville (in thousands of dollars) as a function of *Size* (measured in thousands of square feet) and whether or not there is a fireplace (*FP* is 0 if there is a fireplace, 1 if no Fireplace). Part of the regression output is provided below, based on a sample of 20 homes. Some of the information has been omitted.

Variable	*Coefficients*	*Standard Error*	*t Stat*
Intercept	128.93746	2.6205302	49.203
Size		1.2072436	11.439
FP	6.47601954	1.9303612	3.27

The estimated coefficient for *Size* is approximately

(1) 9.5 (2) 13.8

(3) 122.5 (4) 1442.6

TABLE 1

A microeconomist wants to determine how corporate sales are influenced by capital and wage spending by companies. She proceeds to randomly select 26 large corporations and record information in millions of dollars. The Microsoft Excel output below shows results of this multiple regression.

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.830
R Square	0.689
Adjusted R Square	0.662
Standard Error	17501.643
Observations	26

ANOVA

	df	SS	MS	*F*	*Signif F*
Regression	2	15579777040	7789888520	25.432	0.0001
Residual	23	7045072780	306307512		
Total	25	22624849820			

	Coeff	StdError	*t Stat*	*P-value*
Intercept	15800.0000	6038.2999	2.617	0.0154
Capital	0.1245	0.2045	0.609	0.5485
Wages	7.0762	1.4729	4.804	0.0001

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16. Referring to Table 1, when the microeconomist used a simple linear regression model with sales as the dependent variable and wages as the independent variable, he obtained an R^2 value of 0.601. What additional percentage of the total variation of sales has been explained by including capital spending in the multiple regression?
(1) 60.1%　(2) 31.1%
(3) 22.9%　(4) 8.8%

17. Referring to Table 1, which of the independent variables in the model are significant at the 5% level?
(1) Capital, Wages　(2) Capital
(3) Wages　(4) None of the above

18. Referring to Table 1, what is the *p*-value for testing whether Capital has a negative influence on corporate sales?
(1) 0.05　(2) 0.2743
(3) 0.5485　(4) 0.7258

19. Referring to Table 1, which of the following values for α is the smallest for which the regression model as a whole is significant?
(1) 0.00005　(2) 0.001
(3) 0.01　(4) 0.05

20. Referring to Table 1, what are the predicted sales (in millions of dollars) for a company spending $100 million on capital and $100 million on wages?
(1) 15,800.00　(2) 16,520.07
(3) 17,277.49　(4) 20,455.98

21. Referring to Table 1, one company in the sample had sales of $20 billion (Sales = 20,000). This company spent $300 million on capital and $700 million on wages. What is the residual (in millions of dollars) for this data point?
(1) 874.55　(2) 622.87
(3) –790.69　(4) –983.56

22. The owner of a fish market has an assistant who has determined that the weights of catfish are normally distributed, with mean of 3.2 pounds and standard deviation of 0.8 pound. If a sample of 25 fish yields a mean of 3.6 pounds, what is the *Z*-score for this observation?
(1) 18.750　(2) 2.500
(3) 1.875　(4) 0.750

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23. How many Kleenex should the Kimberly Clark Corporation package of tissues contain? Researchers determined that 60 tissues is the average number of tissues used during a cold. Suppose a random sample of 100 Kleenex users yielded the following data on the number of tissues used during a cold: $\bar{X} = 52, s = 22$. Using the sample information provided, calculate the value of the test statistic.

(1) $t = (52 - 60)/22$　(2) $t = (52 - 60)/(22/100)$

(3) $t = (52 - 60)/(22/100^2)$　(4) $t = (52 - 60)/(22/10)$

24. During a test period, an experimental group of 10 vehicles using an 85% ethanol-gasoline mixture showed mean CO_2 emissions of 240 pounds per 100 miles, with a standard deviation of 20 pounds. A control group of 14 vehicles using regular gasoline showed mean CO_2 emissions of 252 pounds per 100 miles with a standard deviation of 15 pounds. The value of the test statistic for a test of equal variances is

(1) 1.78　(2) 1.33

(3) 1.05　(4) 3.00

25. How many Kleenex should the Kimberly Clark Corporation package of tissues contain? Researchers determined that 60 tissues is the average number of tissues used during a cold. Suppose a random sample of 100 Kleenex users yielded the following data on the number of tissues used during a cold: $\bar{X} = 52, s = 22$. Suppose the test statistic does fall in the rejection region at $\alpha = 0.05$. Which of the following conclusion is correct?

(1) At $\alpha = 0.05$, there is not sufficient evidence to conclude that the average number of tissues used during a cold is 60 tissues.

(2) At $\alpha = 0.05$, there is sufficient evidence to conclude that the average number of tissues used during a cold is 60 tissues.

(3) At $\alpha = 0.05$, there is not sufficient evidence to conclude that the average number of tissues used during a cold is not 60 tissues.

(4) At $\alpha = 0.10$, there is sufficient evidence to conclude that the average number of tissues used during a cold is not 60 tissues.