所別：企業管理學系碩士班 一般類組(丙組) 科目：統計學
(丁組)
企業電子化組(辛組)

1. Two expert wine tasters were asked to rank six brands of wine. Their rankings are shown in the following table. Do the data present sufficient evidence to indicate a positive correlation in the rankings of the two experts? (Pr{r>0.829}=0.05). (10%)

Brand	A	B	C	D	E	F
Expert 1	6	5	1	3	2	4
Expert 2	5	6	2	1	4	3

2 Suppose that it is known that the number of items produced in a factory during a week is a random variable with mean 500.

(1) What can be said about the probability that the week's production will exceed 1000? (5%)

(2) If the variance of a week's production is known to equal 100, then what can be said about the probability that the week's production will be between 400 and 600? (5%)

3 Let x be a random variable denoting the time (in hours) required to produce a product. The probability density function of x is given by

$f(x)= 2x - 4$ if $2 \leqq x \leqq 3$, $f(x) = 0$ otherwise

The profit (in dollars) which the producer makes on a product is $g(x) = 10 - x$

What is the probability that the profit on a individual product will be greater than \$7.5? (10%)

4 Consider the problem of comparing the reaction times of subjects under the influence of three different drugs. Each of the three drugs is administered to the same subject with suitable time lags between the three doses. The data is shown as below.

Subject	1	2	3	4	5	6
Drug A	1.21	1.63	1.42	2.43	1.16	1.94
Drug B	1.48	1.85	2.06	1.98	1.27	2.44
Drug C	1.56	2.01	1.70	2.64	1.48	2.81

Test the hypothesis that the population of reaction times are identically distributed for all three drugs at α=0.05. (20%)

5 Many track runners believe that they have a better chance of winning if they start in the inside lane that is closest to the field. For the data below, the lane closest to the field is Lane 1, the next lane is Lane 2, and so on until the outermost lane, Lane 6. The table lists the number of wins for track runners in the different starting positions. Test the claim that the probabilities of winning are the same in the different positions. Use $\alpha = 0.05$. The results are based on 240 wins. (20%)

Starting Position	1	2	3	4	5	6
Number of Wins	36	33	45	50	44	32

6 Data {xi, Yi} i=1, 2, …, n, n=12. The fitted line is $\hat{Y} = 10.5836 + 0.5632\ X$

MSE=0.0557 F=160.26 $\sum_{i=1}^{12} x_i = 174$

(1) Compute the correlation for x and Y (20%)

(2) Compute the adjusted R^2 (5%)

(3) Find the 95% confidence interval for $\overline{Y}$ (5%)

Note: $\chi^2_{0.05,6} = 12.59$ $\chi^2_{0.05,5} = 11.07$ $\chi^2_{0.05,2} = 5.99$ $t_{0.05,10} = 1.812$ $t_{0.05,5} = 2.015$