國立嘉義大學九十五學年度
管理研究所碩士班招生考試（丙組）試題

科目：統計學

1. 隨機抽查六位高職畢業生的平均成績和起薪，如下表所示：

畢業生	1	2	3	4	5	6
平均成績 X	71.50	93.50	93.00	88.00	96.25	79.75
起薪 Y（仟元）	11	14	18	13	16	12

假設此資料適合做迴歸分析，請回答下列問題：(25%)
（1）配出迴歸方程式。
（2）若甲生的平均成績為 82.50，求其起薪的點估計值。
（3）迴歸方程式對總變異平方和提供了多少的解釋能力。

2. 假設有三部機器，分別由五位作業員來操作，記錄各作業員操作各部機器的產量，結果如下表所示：

作業員	機　器		
	1	2	3
1	53	61	51
2	47	55	51
3	46	52	49
4	50	58	54
5	49	54	50

試以變異數分析表（ANOVA）檢定各機器的性能與各作業員的能力是否有顯著差異？（$\alpha = 0.05$；$F_{0.05}(2,8) = 4.46$；$F_{0.05}(4,8) = 3.84$；$F_{0.05}(8,2) = 19.37$；$F_{0.05}(8,4) = 6.04$）（25%）

3. The Times magazine reported that of the 94 patients treated for skin cancer (melanoma lesions), "the average time from their surgery and injection to the occurrence of melanoma was 30 months." In the past, the population average of other groups of melanoma patients receiving alternative types of treatment had been 17.5 months. (25%)
   (a) State the null and alternative hypotheses to test whether the new treatment results in a greater average time before the recurrence of the melanoma. (Define all notations.)

   (b) Draw a diagram showing the null hypothesis rejection region for a test at a 5% Type-I error level. (Make sure to label all points of interest.)
   (c) If the p-value for the test was 0.0002, what was the population standard deviation?
   (d) Given the answer in (c), how do you know that the population of time before recurrence of the melanoma cannot be normally distributed? What does the population look like?

4. In a lottery game, a player selects 6 integers out of the first 49 positive integers. The sponsor then randomly selects 6 out of the first 49 positive integers. Cash prizes are given to a player who matches 4, 5 or 6 integers. Let X equal the number of integers selected by a player that match integers selected by the sponsor. (25%)
   (a) State the p.d.f of X.
   (b) Calculate the mean, variance, and standard deviation of X.
   (c) What value of X is mostly likely to occur?
   (d) On March 4, 2005, the jackpot was worth $450,000,000. When the prize is large, a lot of bets are placed. Out of 25,000,000 bets that were placed, 3 people matched 6 number and 390 matched 5 numbers, 22187 matched 4 numbers. Are these number of winners consistent with the probability model?