國立嘉義大學九十五學年度
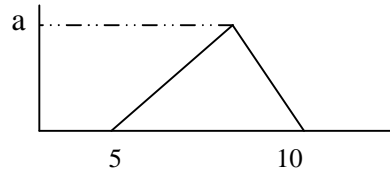# 運輸與物流工程研究所碩士班招生考試試題

科目：統計學 *可使用計算機*

1. Consider a random variable, X, having a probability density function with the following triangle shape.

   (1) Find the value of a. (8%)

   (2) Find the mean value of X. (8%)

   (3) Find the variance of X. (9%)

2. A college student is planning to take four examinations. He will take the first exam in January. If he passes that exam, he will take the second exam in February. If he passes the second exam, he will take the third exam in March, and if he passes the third exam, he will take the fourth exam in April. If he fails an exam, then he is not allowed to take any others. The probability of his passing the first exam is p_1. If he passes the first exam, the conditional probability of his passing the second exam is p_2. If he passes the first and second exam, the conditional probability of his passing the third exam is p_3. If he passes the first three exams, the conditional probability of his passing the fourth exam is p_4.

   (1) What is the probability that he passes all exams? (8%)

   (2) Given that he did not pass all exams, what is the conditional probability that he failed the third exam? (8%)

   (3) Given that he passes the first and second exams, what is the conditional probability that he does not pass all the exams? (9%)

3. A calculus achievement test is given to a random sample of 25 college students. The scores and gender (coded as 1 for females and 2 for males) are given below.

Gender	1	2	2	2	1	1	1	1	1	2	2	2	1
Score	83	68	78	67	91	78	81	75	95	62	81	93	89

Gender	1	2	2	2	1	1	2	1	2	1	1	2
Score	93	87	60	74	87	74	92	72	81	95	85	74

   (1) Use the pooled t-test to decide whether there is a significant difference in scores between females and males ($\alpha=0.05$). (15%)

   (2) What are the basic assumptions if the pooled t test is applied? (6%)

   (3) What p-value is associated with the value of test statistic computed in Item (1)? (4%)

4. The number of books borrowed from a public library for a particular week given below. Determine whether the number of books borrowed depends on the day of the week ($\alpha=0.05$). (25%)

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Books	123	107	120	116	134