國立政治大學　112　學年度 碩士班暨碩士在職專班 招生考試試題

考試科目	統計學	系所別	風險管理與保險學系管理組	考試時間	2 月 3 日(五) 第 4 節

1. Assume that 30% of the population is hypertensive. An automated blood-pressure testing device is used to examine the prevalence of hypertension. Suppose that 80% of hypertensives and 20% of normotensives are classified as hypertensive by this device. What is the predictive value positive (also known as "precision") of the device? (15%)

2. Two players join in a coin-flipping game. They take turns in flipping a coin. The probability that the coin will come up heads is t. The first player to obtain a head is the winner. Suppose that we are interested in the probability that the first player to flip is the winner. This probability is referred to be as $f(t)$.

   (a) Find the value of $\lim_{t\to 1} f(t)$. (10%)

   (b) Find $f(t)$. (15%)

3. Alex is playing a gambling game where he draws a card from a 52-card playing deck. He will be paid 15 dollars for drawing a king or an ace and 5 dollars for drawing a jack or a queen. He will have to pay 4 dollars if he draws any other card. What is the expected value of his gain from this game? (15%)

4. The length of time required by patients to complete a one-hour medical test is a random variable with a density function as follows.

   $f(t) = at^2 + t, 0 \le t \le 1; 0, otherwise$

   Find a. (10%)

5. (a) What is a random variable? (5%)
   (b) What is a random sample? (5%)
   (c) What is a confidence interval? (5%)

6. Show your understanding of key classical assumptions of ordinary least squares linear regression. (20%)

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。