

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 10 日(四) 第 4 節
<p>1. Suppose that the probability of having an earthquake tomorrow only depends on whether or not an earthquake occurs today. Assume that if an earthquake occurs today then there will be an earthquake tomorrow with a probability of 0.8; if there is no earthquake today, then there is an earthquake tomorrow with a probability of 0.5. What is the limiting probability of having an earthquake? (15%)</p> <p>2. Suppose independent trials are conducted consecutively. Each and every one of them leads to a success with a probability of <math>t</math>. Find <math>E(N^2)</math>, if <math>N</math> represents the trial number of the first success. (15%)</p> <p>3. (a) Please describe the Law of Large Number and how it can be applied in insurance operations. (10%) (b) Please describe the Central Limit Theorem and how it can be applied in insurance operations. (10%)</p> <p>4. Suppose the average English marks in the whole population of college students is 175. Assume that the mean English marks of 10 students is 200 and the standard deviation is 50. (<math>z_{0.05} = 1.645</math>; <math>z_{0.025} = 1.96</math>; <math>z_{0.0099} = 2.33</math>; <math>\Phi(1.50) = 0.9332</math>, <math>\Phi(1.58) = 0.9429</math>, <math>\Phi(1.64) = 0.9495</math>, where <math>\Phi(x) = Pr(X \leq x)</math>) (a) Test the hypothesis under the significance level of 0.05 that the mean mark is higher in this group than in the population. (10%) (b) Calculate the exact <math>p</math>-value. (15%)</p> <p>5. Suppose that <math>T_1</math> and <math>T_2</math> are random variables and have the joint density function given by</p> $f(t_1, t_2) = 3t_1, \quad 0 \leq t_2 \leq t_1 \leq 1,$ $f(t_1, t_2) = 0, \quad \text{otherwise}$ <p>(1) Find <math>P(T_1 \leq 3/4, \text{ given } T_2 \leq 1/2)</math>. (10%) (2) Find <math>P(T_1 \leq 3/4, \text{ given } T_2 = 1/2)</math>. (15%)</p>					
備 註	<p>一、作答於試題上者，不予計分。 二、試題請隨卷繳交。</p>				