

# 淡江大學 97 學年度轉學生招生考試試題

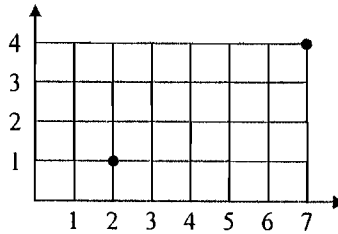
系別：資訊工程學系三年級

科目：離 散 數 學

可否使用計算機			
可		否	✓

本試題共 5 大題， 1 頁

1. Prove that if an integer  $a$  is such that  $a - 2$  is divisible by 3, then  $a^2 - 1$  is divisible by 3. (20%)
  
2. Determine the number of (staircase) paths in the  $xy$  plane from  $(2, 1)$  to  $(7, 4)$ , as shown in the following figure, where each such path is made up of individual steps going one unit to the right (R) or one unit upward (U). (20%)



3. Prove by induction that for any  $n \in \mathbf{Z}^+$ ,  $1 + 2 + 3 + \dots + n = n(n + 1)/2$ . (20%)
  
4. Solve the recurrence relation  $a_n + a_{n-1} - 6a_{n-2} = 0$ , where  $n \geq 2$  and  $a_0 = 1, a_1 = 2$ . (20%)
  
5. Prove or disprove that any subset of size six from the set  $S = \{1, 2, 3, \dots, 9\}$  must contain two elements whose sum is 10. (20%)