

## 淡江大學九十四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

准帶項目請打「V」

X	簡單型計算機
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節次：7月13日第4節  
本試題共1頁**Show enough work to justify your answer!**

1. Use Mathematical induction to prove that the following statement is true.

For each integer  $n \geq 5$ ,  $2^n > n^2$ . (25%)

2. Write an expression for  $a_r$  where  $a_r$  is the coefficient of  $X^r$  in the given generating function  $A(X) = \frac{3}{(1-X)^2} - \frac{7}{(1-2X)^3} + \frac{8}{3+2X}$ . (25%)

3. In how many ways can 22 distinguishable books be given to 5 students so that 2 of them get 5 books and the other 3 will have 4 books each? (25%)

4. Determine if the following relation  $R$  on the set of real numbers is

- (a). reflexive
- (b). symmetric
- (c). transitive
- (d). irreflexive
- (e). antisymmetric
- (f). asymmetric

Define  $(x,y) \in R$  if and only if  $x^2 + y^2 = 1$ . (25%)