

淡江大學八十八學年度日間部轉學生招生考試試題

49

系別：資訊工程學系三年級

科目：離散數學

本試題共 1 頁

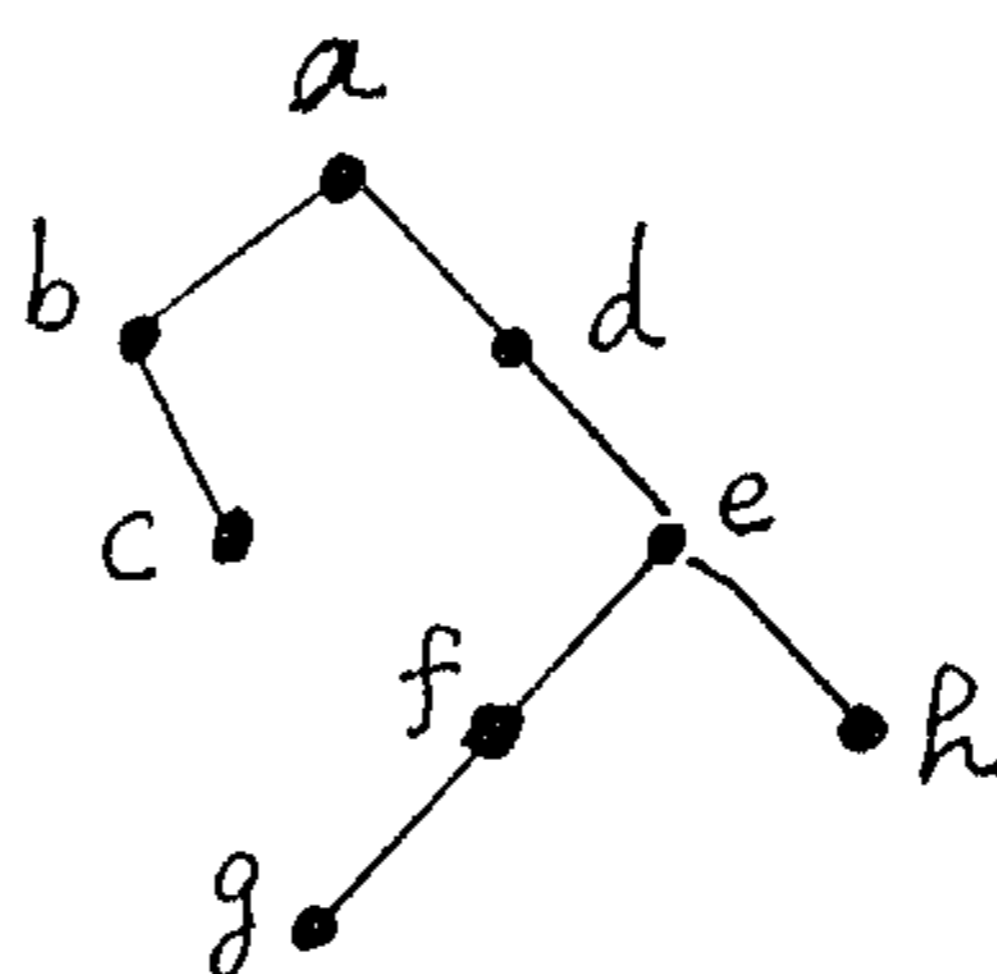
● 所有的答案必須將過程寫出。

49

1. Prove by induction: $1 + 2 + \dots + n < 1/8 (2n+1)^2$ for integer $n \geq 1$. (18 分)

2. Let R be a symmetric and transitive relation on a set A . Show that if for every $a \in A$ there exist $b \in A$ such that $(a,b) \in R$ then R is an equivalence relation. (18 分)

3. Write the nodes of the given binary tree in
a. inorder,
b. postorder. (20 分)



4. Of 100 people surveyed (問卷調查), 52 were women, 40 eat breakfast, 30 eat lunch, 25 eat breakfast and lunch, 27 were women who eat breakfast or lunch. How many were men who do not eat breakfast and do not eat lunch? (14 分)

5. Show that each of the following argument (敘述) is invalid (不正確) by providing a counter example (舉反例) - that is, an assignment of truth values for the given primitive statements p , q , r , and s such that all primitives are true while the conclusion is false. (即指定 p, q, r, s 的真假值使得全部的 primitives 為真但最後的結論為假。)(20 分)

a. $[(p \wedge q) \rightarrow r] \wedge (\neg q \vee r) \rightarrow p$

b.
$$\begin{array}{l} p \\ p \rightarrow r \\ p \rightarrow (q \vee \neg r) \\ \neg q \vee \neg s \end{array}$$

$\therefore s$

6. True or False. Explain. (10 分)

The total number of humans (living and dead) who have been married an odd times is even. (所有結婚次數為奇數(如 1, or 3...次)的總人口數目(包含活人與死人)必為偶數。)