

V2

October 2, 2000

cs330 - Discrete Structures
Fall 2000

Midterm Exam
 closed books, closed notes

Starts: **8:35 am**Ends: **9:50 am**

Name: _____ (please print)

ID: _____

Problem	Max points	Your mark	Comments
1	10		10*1
2	15		5*3
3	10		4+3+3
4	5		
5	12		4*3
6	8		2*4
	60		

1. Let $A = \{a, \{b\}, ?\}$. Mark with true (T) or false (F) each of the following statements:

Statement	T/F
$a \in A$	
$\{a\} \in A$	
$\{a, b\} \in A$	
$A \in A$	
$\{a, b\} \in \text{power}(A)$	

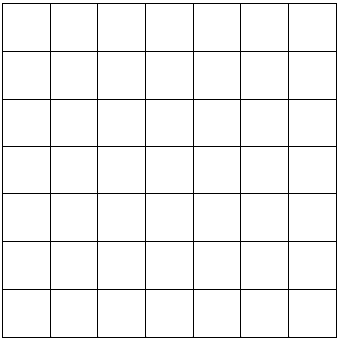
Statement	T/F
$\{a\} \in A$	
$\{b\} \in A$	
$\{a, b\} \in A$	
$\{a, b\} \in \text{power}(A)$	

2. Let $S = \{1, 2, 3, 4\}$ and a relation R on S defined as

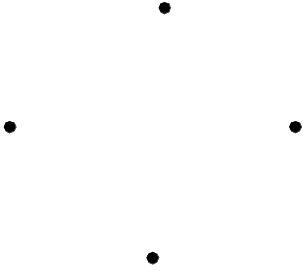
$$a R b \text{ if and only if } (a+b) < 2b, a, b \in S$$

a) show the set representation of R

b) show the matrix representation of R . c) Show the digraph of R



The matrix of R .



The digraph of R

d) mark with true (T) or false (F) the following statements. If your answer is true then give an example

Statement	Your answer (T/F)	Example
There is a cycle in the digraph		
There is a path of length 3 in the digraph of R		

e) Decide whether the relation R on S is an equivalence relation or not. If it is then show the partition it creates on S .

3. This is the postfix (reverse Polish) notation for an algebraic expression:

$$xy^*cd+ef/--a^*$$

a) Show the tree representation of this expression.

b) Show the corresponding algebraic expression

c) the power set of a set

d) tree

6. Explain the difference between:

a) a set S and a partition of the set S

b) a set and a list