

MATH1061 — DISCRETE MATHEMATICS
First Semester Examination, June 2001 (continued)

11. (6 marks) Use Mathematical Induction to prove that, for all integers $n \geq 4$,
 $3n + 1 < 2^n$.

MATH1061 — DISCRETE MATHEMATICS
First Semester Examination, June 2001 (continued)

12. (9 marks)
Binary relations α and β are defined on the set \mathbb{Z}^+ of positive integers by:
 $m \alpha n$ if and only if $m + n$ is even;
 $m \beta n$ if and only if $m \mid n$, that is, m divides n .
Insert ticks (for yes) or crosses (for no) into the following table, to show which properties these relations on \mathbb{Z}^+ have.

	α	β
Reflexive		
Symmetric		
Antisymmetric		
Transitive	*	
Equivalence relation		

Explain your answer to the box marked *.

Precisely ONE of these relations is an equivalence relation.
State which one, and give its equivalence classes.