



MAS 117

Introduction to Algebra

Assignment 7

For handing in on 7 March 2007

*Write your name and student number at the top of your assignment before handing it in. Staple all the pages together. Post the assignment in the **RED** post-box on the **BASEMENT** of the Maths building before 16:00 on Wednesday.*

- 1 (50 marks) Your chance to mark the test!** For each of the statements below,
- explain what (if any) mistakes it contains, and
 - write down what you would say to the person who wrote it to clear up the misunderstandings.
- (a) We have to prove the statement is true for $n = n + 1$.
- (b) one-to-one if the function produces only one unique value from $A \rightarrow B$; onto if the function produces more than one unique value.
- (c) The contrapositive of the statement
- “If n is an even integer greater than 2, then n is the sum of two prime numbers.”
- is
- “If n is an odd integer less than 2, then n is the sum of two non-prime numbers.”
- (d) $A \cap B = B \cap A$, so the distributive law holds for the operation of union on the subsets of $\mathcal{S}$.
- 2 (50 marks)** Let $F = \{0, 1\}$ denote the field of integers mod 2.
Show that the polynomial $x^3 + x + 1$ is irreducible over F .
Hence construct a field with eight elements. (You should write down the addition and multiplication tables of your field.)