MAT 141
Problem Set #1

due in recitation on September 2 or 3, 2004

1. Prove theorems I.5 and I.6. You may only use the six field axioms and theorems I.1 – I.4. Be sure to explicitly state which axioms and theorems you are using.
2. Apostol, section I 3.3 # 4, 8
3. Consider the set $F = \{0, 1, a, b\}$.
   (a) Write down an addition table for F consistant with the field axioms and such that $1 + 1 = a$ and $1 + a = b$.
   (b) Prove that there is no way to define multiplication consistant with the field axioms and your answer to part (a). (Hint: What is $a \cdot a$?)