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 \( a \cdot a \)?)