Introduction to Algebra, MATH 4127

Homework 1, Section 0

Due Friday January 25, 2013 at 2:30

0.14a. Show that $[0, 1]$ and $[0, 2]$ have the same cardinality by giving a formula for a one-to-one function f mapping $[0, 1]$ onto $[0, 2]$. Confirm that your function is one-to-one and onto using the definitions of "one-to-one" and "onto."

0.17. Let A be a finite set with $|A| = s$. Consider Exercise 0.16 and make a conjecture about the value of the cardinality of the power set $\mathcal{P}(A)$. Prove your conjecture using Mathematical Induction.

0.34. Determine whether "$n \, \mathcal{R} \, m$ in $\mathbb{Z}^+$ if n and m have the same final digit in the usual base ten notation" is an equivalence relation. That is, check if $\mathcal{R}$ is reflexive, symmetric, and transitive. If so, describe the partition arising from the equivalence relation.