Class Problem
Math 2513
February 22, 2005

PROBLEM. Let B_7 denote the set of all bit strings of length 7, and let $f : B_7 \rightarrow \mathbb{N} \times \mathbb{N}$ be the function defined by $f(\alpha) = (n, m)$ where $\alpha \in B_7$ is a bit string with n zeroes and m ones.

(a) What are the domain and codomain of f?

(b) Describe the range of f by listing out all of its elements.

(c) Show that f is not injective.

(d) Let A be the subset of B_7 consisiting of strings that start and end with 11 and have a zero in the 4th position. List out the elements of $f(A)$.