MATH 235 01: Basic Algebra   Fall 2002

Assignment 1

1) Prove that 5 is a factor of $2^{4n-2}+1$ for every positive integer n.

2) Prove that $2^n > n^2$ for every integer $n \geq 5$.

3) Let A be a set of n elements (n is a natural number). Prove that A has precisely 2^n different subsets.

4) Let $\mathbf{R}$ be the set of all real numbers. Prove that the function $f : \mathbf{R} \to \mathbf{R}$ given by $f(x) = -2x + 3$ is a bijection.

5) Find a bijection $f : \mathbf{N} \to \mathbf{Z}$ where $\mathbf{N}$ is the set of natural numbers and $\mathbf{Z}$ is the set of integers.

6) Let A, B be subsets of a set U. Prove that

$$U - (A \cup B) = (U - A) \cap (U - B)$$