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 $n \ge 5$.
- 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 **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 **N** is the set of natural numbers and **Z** is the set of integers.
- 6) Let A, B be subsets of a set U. Prove that

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