Algorithms: Assignment 1

Due date: August 28 (Wednesday)

Problem 1 (5 points)
Prove the following equalities:

(a) $1 + x + x^2 + x^3 + ... + x^n = \frac{x^{n+1}-1}{x-1}$ (where $x \neq 1$).

(b) $(1 + 2 + 3 + 4 + ... + n)^2 = 1^3 + 2^3 + 3^3 + 4^3 + ... + n^3$.

Problem 2 (5 points)
Consider an array $A[1..n]$ whose elements are distinct integer numbers, and describe an algorithm that finds the largest and second largest elements of this array using at most $(n + \lceil \log_2 n \rceil)$ comparisons.