

## Homework 11

Prove by induction that for every positive integer  $n$ , and every positive numbers  $a_1, a_2, \dots, a_{2^n}$ , the following identity holds:

$$\frac{a_1 + a_2 + \dots + a_{2^n}}{2^n} \geq (a_1 a_2 \dots a_{2^n})^{\frac{1}{2^n}} .$$

Be careful. You have to prove the inequality for powers of two, that is for 2, 4, 8, 16, ... numbers. So you assume that the inequality holds for  $2^n$  numbers and prove it for  $2^{n+1}$  numbers. As a hint, break the sum of  $2^{n+1}$  numbers into two sums of  $2^n$  numbers.