## MATH 173, FALL 2022, HOMEWORK #5

## ALEX IOSEVICH

## 1. PROBLEMS NOT FROM THE BOOK

**Problem:** Prove that if  $a_1, a_2, \ldots, a_n$  are positive real numbers, then

$$\left(\prod_{i=1}^n a_i\right)^{\frac{1}{n}} \le \frac{1}{n} \sum_{i=1}^n a_i.$$

**Hint:** First prove this when n = 2. Then prove it for  $n = 2^m$ , m = 1, 2, ... by induction. Then prove it for all n by arguing that if the inequality holds for n + 1, then it holds for n.

2. PROBLEMS FROM THE BOOK

Section 2.3, problems 2, 3, 7, 10, 11, 12