COS 341, October 4, 2000

Due: October 11, 2000

Homework Set 3

Reading Assignments Finish reading Chapter 5; read Chapter 4.5.

Written Assignments Do exercises 5, 10, 18, 28, 37, 43 and 44 in Section 5.8.

Special Problem (counted as 1 Exercise).

Let $n > 1$ be any integer, and for $1 \leq k \leq n-1$, let

$$a_k = \frac{k}{n}\left(\frac{1}{k} + \frac{1}{k+1} + \cdots + \frac{1}{n-1}\right).$$

Prove that there exists k_0 ($1 \leq k_0 \leq n-1$ and may depend on n) such that

$$a_1 < a_2 < \cdots < a_{k_0} \geq a_{k_0+1} > a_{k_0+2} > \cdots > a_{n-1}.$$

Remark You should give a rigorous proof for the statement in Exercise 28. Try to be precise and concise.