Homework 2

1. Show that \( \sum_{k=1}^{n} k \ln k = \Theta(n^2 \ln n) \) in three different ways:
   
i. by induction on \( n \),
   
   ii. by bounding the terms of the sum by the largest or middle terms, and
   
   iii. by comparing with an integral.

2. Exercise 4.1-1.

3. Exercise 4.2-2.