Supplementary homework problems, due May 27, 2009

1. Give a careful derivation of (7.7) in the book.

2. Let $A = \limsup_{x\to\infty} \theta(x)/x$ and let $a = \liminf_{x\to\infty} \theta(x)/x$. Show that

$$(a + o(1))x \log x \ \leq \ \sum_{p\leq x} \theta\left(\frac{x}{p}\right) \log p \ \leq \ (A + o(1))x \log x$$

as $x \to \infty$.