Math 115. Problem Set #13

Due Thursday 27 April

Section 7.4 (Page 336)
4, 5, 7.

Section 7.5 (Page 340)
3, 4, 6.

Extra problem #1
Prove the “stronger inequality” of Theorem 7.12 using the second assertion of Theorem 7.13 (instead of the method given in the book’s proof of Theorem 7.12).

Section 7.6 (Page 344)
3, 5.

Extra problem #2
Let $\xi$ be an irrational (real) number, and let $\xi = \langle a_0, a_1, a_2, \ldots \rangle$ be its expansion as an infinite simple continued fraction. Show that there exists a number $M$ such that $a_n \leq M$ for all $n$, if and only if there is a number $c > 0$ such that

$$\left| \xi - \frac{h}{k} \right| < \frac{1}{ck^2}$$

is false for all $\frac{h}{k} \in \mathbb{Q}$ (with $h, k \in \mathbb{Z}$ and $k > 0$, as usual).