MA3201 - PROBLEM SHEET 1
EXTENDED VERSION
FALL 2008

The problem session will be on Thursday September 11th.

Problems from the book:

Page	Exercise number
173–4	1a)b)c), 5a), 6, 7
187	1
194	$4^*, 5, 6, 7$

Problem 1. What is the centre of $M_2(\mathbb{R})$?

Problem 2*. What is the centre of $\mathbb{H} = \{ \left(\begin{smallmatrix} a & b \\ -\bar{b} & \bar{a} \end{smallmatrix} \right) \mid a, b \in \mathbb{C} \}$?

Problem 3*. Show that if R is a Boolean ring, then $2 \cdot x = 0$ for each x in R.

Problem 4. Let F be a field and G a finite group. Show that the group ring FG is commutative if and only if G is abelian.

Problem 5. Let $R = FQ$, where F is a field and Q is the quiver $1 \xrightarrow{u} 2 \xrightarrow{v} 3$. Describe the left ideal Re_1 and the right ideal $e_1 R$.

Problem 6. Let $R = \left(\begin{smallmatrix} F & 0 \\ F & F \end{smallmatrix} \right)$ where F is a field. Let I be the ideal $\left(\begin{smallmatrix} 0 & 0 \\ F & 0 \end{smallmatrix} \right)$. Find all ideals in R containing I.

Problems marked with * can be handed in at the lecture Monday September 8th.