Math 8201 **Homework 6** **PJW**

Date due: October 21, 2008 There will be a quiz on this date. Hand in the 5 starred questions.

Section 5.2 5.18, 5.19, 5.28*, 5.29* (the hint to (i) is too complicated: you do not have to do it that way), 5.30, 5.31*

HH (This is more general than exercise 5.25.) Show that $O_p(G)$ equals the intersection of the Sylow p-subgroups of G.

II* Let G be a group of order 105. Show that G is the direct product of a group of order 21 and a group of order 5. Show further that G has a normal cyclic subgroup of order 35.

JJ Let G be a group of order 1001. Show that G is cyclic.

KK Show that there are no simple groups of orders 200, 231; 351, 1365, 6545.

LL* Let G be a simple group of order 504. Find the number of Sylow 7-subgroups of G. Show that G has a unique conjugacy class of subgroups of index 8.