Assignment 6 – MA 542

Due in class: Friday, Feb. 26, 2010

Chapter 18: 8, 14, 15, 18, 22, 32, 33, 36 (Edition 6: same numbers)

(1) Determine whether every non-zero prime ideal in a PID is maximal.

(2) Let $R = \mathbf{Z}[i]$ and d be its size function $d(x + yi) = x^2 + y^2$. Let $a = 2 + 3i$ and $b = 1 + 2i$. Perform division with remainder of a by b, i.e. find $q, r \in R$ with $r = 0$ or $d(r) < d(b)$ such that $a = bq + r$. Hint: Use a lattice as we did in class, or follow example 7 of chapter 18 of the book.