HOMEWORK 8

DUE **FRIDAY** 16 MARCH 2012 **IN CLASS**

1. Formulate and prove a version of Corollary 9.24 for negative discriminants $D \equiv 1 \pmod 4$.
Hint: by the proof of Proposition 9.22, H *is the subgroup of squares.*

2. Let p be a prime number which is represented by forms $f(x, y)$ and $g(x, y)$ of discriminant D.
(a) Show that $f(x, y)$ and $g(x, y)$ are equivalent.
Hint: use Lemma 9.8 and examine the middle coefficient modulo p.

(b) If $f(x, y) = x^2 + ny^2$ and $g(x, y)$ is reduced, show that $f(x, y) = g(x, y)$.

3. Prove that $p = x^2 + 10y^2 \iff p \equiv 1, 9, 11, 19 \pmod{40}$.

4. Prove that $p = x^2 + 21y^2 \iff p \equiv 1, 25, 37 \pmod{84}$.