# MATH 748: HOMEWORK 7

(1) Find the class numbers of $\mathbb{Q}(\sqrt{-163})$, $\mathbb{Q}(\sqrt{-10})$, and $\mathbb{Q}(\sqrt{14})$. Make sure to prove any claims that ideals are non principal. (Hint: you can use Dedekind's theorem to help tell you how primes factor in $\mathcal{O}_K$.)
(2) Milne 4-4
(3) Milne 4-5
(4) Milne 4-6
(5) Use sage to compute the $e_i, f_i$ of the primes occurring in the factorization of $p\mathcal{O}_K$ for the first 200 primes $p$ in $\mathbb{Z}$ for 4 different quadratic fields $K$, 4 different Galois cubic fields $K$, and 4 different non-Galois cubic fields $K$. For each $K$, make a table tabulating how many of each splitting type (i.e. $(e_i, f_i)$ data) occur. Notice anything about how often each possibility occurs? What is needed to prove something about how often each possibility occurs in the quadratic case?