1 Elliptic Curves

Let $E/\mathbb{Q}$ be an elliptic curve, let p be a prime of good reduction then E_p is either ordinary or supersingular. There are infinitely many primes of ordinary reduction.

Theorem 1.0.1 (Serre)**.** The set of primes of ordinary reduction has positive density. After $L/\mathbb{Q}$ finite, the set of ordinary primes has denisty 1.

Theorem 1.0.2 (Shimura-Tanayama)**.** If E has CM by $F/\mathbb{Q}$ then the set of ordinary primes has denity $1/2$ (p is ordinary iff p is split in $F/\mathbb{Q}$).