# MA40238 NUMBER THEORY 2013/14 SEMESTER 1 WEEK 5 OVERVIEW 

Recap from Last Week

We talked about

- Legendre and Jacobi symbols (their similarities and differences);
- their properties (7 rules for each);
- computation of Legendre and Jacobi symbols;
- given an integer $a$, how to find all odd primes for which $a$ is a quadratic residue.


## Monday Lecture

The topic is Gauss' Lemma, which is

- an essential ingredient in the proof of Quadratic Reciprocity;
- another handy tool for computing Legendre symbols.

We will see

- the statement of Gauss' Lemma;
- how to use it to compute Legendre symbols (in examples);
- the proof of Gauss' Lemma;
- a consequence of Gauss' Lemma.


## Tuesday Lecture

There are two topics:

- We will prove Quadratic Reciprocity, using a nice geometric observation due to Gauss.
- We will prove a refinement of Euclid's Theorem on infinitely many primes: there are infinitely many primes congruent to 1 modulo 4 (or -1 modulo 4 ). You are expected to learn the method and prove similar statements.

