ASSIGNMENT 3, MP313, Semester 2, 1999

Please hand in by Monday 5pm, 17th October 1999.

1. Use Thue's method to express the prime $p = 1048601$ in the form $p = x^2 - 2y^2$, $x, y \in \mathbb{N}$.

2. Verify that the Legendre symbol $\left(\frac{35}{1201}\right) = 1$ and use Tonelli's algorithm to solve $x^2 \equiv 35 \,(\mathrm{mod}\, 1201)$.

3. Let g be a primitive root (mod p), where $p = 8n + 1$. Verify that $x \equiv g^n + g^{7n} \,(\mathrm{mod}\, p)$ satifies $x^2 \equiv 2 \,(\mathrm{mod}\, p)$.

4. Identify the quadratic irrational α defined by $\alpha = [\overline{1, 2, 3}]$.

5. Find the continued fraction expansion of $(1 + \sqrt{47})/3$.