Number Theory

Sheet 5 — MTH3251

1. Evaluate$(196/1357)$ and find all soulutions for $x^2 \equiv 196 \pmod{1357}$.
2. Calculate the legendre symbol for:
   i. $(19/23)$.
   ii. $(-23/59)$.
   iii. $(20/31)$.
   iv. $(-219/383)$.
3. use legendre symbol to investigate possible solution of the quadratic congruence $ax^2 + bx + c \equiv 0 \pmod{p}$
4. Solve $x^2 + 5x + 1 \equiv 0 \pmod{7}$
5. Evaluate$(33/83)$, then calculate $\sqrt{33} \pmod{83}$.