Collected Problems:

1. Show that if p is an odd prime, $p \nmid a$, $1 \leq i \leq \dfrac{p-1}{2}$, and $1 \leq j \leq \dfrac{p-1}{2}$ then if $ai \equiv -aj \pmod{p}$ then $i = j$.

2. For each of the following compute the value of the Legendre symbol using (a)Euler's criterion (b)Gauss's Lemma: (do not use gp or a similar calculator, show work.)

   (a) $\left(\dfrac{2}{29}\right)$

   (b) $\left(\dfrac{3}{11}\right)$

   (c) $\left(\dfrac{13}{17}\right)$

3. Calculate: (in each the denominator is prime)

   (a) $\left(\dfrac{50}{17827}\right)$

   (b) $\left(\dfrac{917436167}{917804249}\right)$ (Hint:use negative numbers)

4. If p is congruent to 1 modulo 5, then 5 is a quadratic residue modulo p. (Hint: Use Gauss's lemma)