HOMEWORK 8

DUE 22 NOVEMBER 2013

1. Compute

(a) $7^{231} \pmod{31}$;

(b) $17^{941} \pmod{37}$;

(c) $4^{245} \pmod{69}$;

(d) $3^{471} \pmod{15}$.

2. Find the reciprocal of $a \pmod{n}$ (or show that it does not exist) for

(a) $a = 6, n = 29$;

(b) $a = 11, n = 37$;

(c) $a = 3, n = 25$;

(d) $a = 5, n = 91$.

3. Find all the solutions $x \pmod{n}$ of the equation (or show that none exist)

$$x^2 \equiv a \pmod{n}.$$

(a) $a = 6, n = 29$;

(b) $a = 11, n = 37$;

(c) $a = 3, n = 25$;

(d) $a = 5, n = 91$.

4. Find all the pairs of integers x, y such that $x^2 + 5y^2 = 7$.