# Assignment 3, due January 27

## Problem 1

Prove that if p is a prime number then  $x^2 \equiv y^2 \pmod{p}$  if and only if  $x \equiv y \pmod{p}$  or  $x \equiv -y \pmod{p}$ .

# Problem 2

Show that the statement of the previous problem can fail if p is not prime.

#### Problem 3

Show that the polynomial

$$f(x) = x^6 - 10x^4 + 125x^3 + 15x - 2$$

has no integer roots. **Hint:** 5.

#### Problem 4

Find all integer x which satisfy  $10x \equiv 2 \pmod{14}$ .

## Problem 5

Find all x which satisfy all of the relations bellow:

$$x \equiv 1 \pmod{4}$$
$$x \equiv 3 \pmod{11}$$
$$x \equiv 7 \pmod{9}$$