

HOMEWORK 7

DUE 28 FEBRUARY 2013

1. Find all integer solutions to $y^2 = x^5 - 1$. *Hint: similar to the case $y^2 = x^3 - 1$. Do not forget to account for fifth roots of unity.*
2. Find the prime factorization of the following integers in $\mathbb{Z}[i]$.
 - (a) 23
 - (b) 13
 - (c) 17
 - (d) 296
 - (e) 415
3. Find the prime factorization of the following gaussian integers in $\mathbb{Z}[i]$.
 - (a) $2 + 12i$
 - (b) $3 + 4i$
 - (c) $7 + 3i$
 - (d) $10 + 9i$
 - (e) $10 + 91i$
4. Can 35 be written as the sum of two squares? How about 45? How about 245?
5. Find an integer that can be written as sum of two squares in 3 different ways.
6. Find an integer that can be written as sum of two squares in 4 different ways.
7. Find an integer that can be written as sum of two squares in 5 different ways.