

March 10, 2002

18.702 Problem Set 5

due Monday, March 17

Many of these exercises are about factoring polynomials. These days you can enter an integer polynomial into standard computer packages which will factor them for you. It is illegal to use the computer while doing this assignment.

I. Chapter 10, Problems 7.7, 7.9.

II. Chapter 11, Problems 1.9a, 2.2a, 4.5, 4.9a,c,e.

III. Starting with reduction modulo 2 as a guide, factor the two polynomials $x^5 + 4x^4 + 7x^3 + 8x^2 + 4x + 6$ and $x^5 + 2x^4 + 7x^3 + 8x^2 + 4x + 6$ in $\mathbb{Q}[x]$.

IV. Factor in $\mathbb{C}[x, y]$: $x^3 + 3x^2y + 2y^3 + x^2 + xy + y + 1$.

V. Find a way to perform division with remainder explicitly and efficiently in the Gauss integers $\mathbb{Z}[i]$. Use your method to do division with remainder of $4 + 36i$ by $5 + i$.