

## Math 75 – Homework #7

posted May 9, 2008; due Monday, May 12, 2008

### Exercises

Do problems 14.2, 14.3, and 14.5-14.10 from the text.

On problem 14.2, do also the case that  $k$  is odd, which is actually easier. Note that in class we have been using the word “generator” and “primitive” interchangeably, but in the hint for this problem they obviously mean something different. When the book says that  $\alpha$  is primitive, it means that the multiplicative order of  $\alpha$  is  $2^k - 1 = n$ . When it says that  $\beta \in \mathbb{F}_{2^k}$  is a generator, it means that  $\mathbb{F}_{2^k} = \mathbb{F}_2[\beta]$ , which is equivalent to saying that the degree of the minimum polynomial of  $\beta$  is  $k$ . Perhaps a more helpful hint on this exercise is to use stuff from the lecture on Wednesday.

For problem 14.9, it should be worded as follows: Let  $G$  be the binary polynomial code of block length 23 generated by  $g(x)$ . Show that  $G$  is cyclic and has rank 12.