**Math 128B, problem set 02**
**REVISED MON FEB 07**
**Outline due: Wed Feb 09**
**Due: Mon Feb 14**
**Last revision due: Mon Apr 04**

**Problems to be done, but not turned in:** (Ch. 13) 35, 41, 45, 47, 57; (Ch. 14) 5, 9, 15, 17, 25, 29, 37, 41, 51, 55, 63.

**Fun:** (Ch. 13) 60; (Ch. 14) 24.

**Problems to be turned in:**

1. (Ch. 13) 44.
2. (Ch. 13) 52.
3. (Ch. 14) 4.
4. (Ch. 14) 10.
5. Suppose that $I$ is a *proper* ideal of $\mathbf{R}[x]$, and that $x^3 - 1$ and $x^2 - 3x + 2$ are elements of $I$. What are the possibilities for $I$? Justify your answer, and for each possibility, find a generating set that is as small as possible.
6. (a) (Ch. 14) 52.
   (b) Now consider the ring $R = \mathbf{Z}_2[x]/\langle x^2 + 1 \rangle$. Write down all elements or $R$ and make addition and multiplication tables for $R$. Is $R$ a field? Prove your answer.
7. (Ch. 14) 26.