

120B: Homework 4
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1. BOOK EXERCISES

Complete the following book exercises:

Section 23: 4, 11, 14, 16, 25, 34.

Section 26: 3, 28, 34.

2. EXTRA EXERCISES

Exercise 1

Find all irreducible polynomials in $\mathbf{F}_2[X]$ of degree at most 4.

Exercise 2

Let $a \in \mathbf{C}$ and consider the map

$$\begin{aligned}\varphi : \mathbf{C}[X] &\rightarrow \mathbf{C} \\ f &\mapsto f(a).\end{aligned}$$

- (a) Compute the image of φ .
- (b) Show that there is a $g \in \mathbf{C}[X]$ such that $\ker(\varphi) = g\mathbf{C}[X]$.
- (c) What does the fundamental homomorphism theorem say in this case (Theorem 26.17)?