

MATH 340 Assignment 7, Fall 2010

Michael Monagan

This assignment is due Wednesday November 24th at 11:20am in the drop off box. For problems requiring Maple please submit a printout of a Maple worksheet. Late penalty: -20% for up to 24 hours late. Zero after that.

Section 2.8: Extension Fields

Exercise 13.

Section 2.9: Multiplicative Structure of Finite Fields

Exercises 1(ii), 5.

Section 2.10: Primitive Elements

Exercises 2, 4(i), 5, 6.

Use the result of exercise 4(ii) to answer question 5.

Use Maple for exercise 6.

Also, find the smallest primitive element in \mathbb{Z}_{31} . Now apply exercise 4 (i) to determine the other primitive elements in \mathbb{Z}_{31} .

Section 2.11: Subfield Structure of Finite Fields

Exercises 2, 4, 5.

Section 2.12: Minimal Polynomials

Exercises 3, 4, 6.

Do 4 by hand and 6 using Maple.

Also, work through the details of example 2.12.4, i.e., find the minimal polynomial $m_\alpha(x) \in \mathbb{Q}[x]$ for $\alpha = \sqrt{2} + \sqrt{3}$ using linear algebra.