

MATH 340 Assignment 7, Fall 2008

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This assignment is due Wednesday November 19th at 11:00am 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 12.

Section 2.9: Multiplicative Structure of Finite Fields

Exercises 1(ii), 5.

Section 2.10: Primitive Elements

Exercises 2, 4, 5, 6.

Use Maple for exercise 6. Check that your answer agrees with exercise 4.

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.

Section 2.12: Minimal Polynomials

Exercises 3, 4, 6.

Do 4 by hand and 6 using Maple.

Also, find the minimal polynomial $m_\alpha(x) \in \mathbb{Q}[x]$ for $\alpha = \sqrt{2} + \sqrt{3}$ using linear algebra, i.e. setting up a linear system over \mathbb{Q} to solve. You are given that $\deg(m) = 4$.