

Math 392: Homework 3 (due W January 30)

Part I: reading. Review all the material in chapter 5. The first midterm (on Wednesday February 6) will be based closely on this chapter and the homework problems in HW1, HW2 and HW3. You should especially go over the definitions of equivalence relation, field of fractions, homomorphism, image, kernel, surjective, injective, bijective, subring, ideal, quotient ring, and the first isomorphism theorem.

Incidentally, there will be no graded homework set next week. Instead I will be giving you a practise midterm with solutions to be given out (and gone over) in class on Monday February 4.

Part II: questions from the book.

Exercises 5.1: 7.

Exercises 5.2: 3, 11 (Remember: direct sum of two rings means the same as the thing we called the Cartesian product of two rings).

Exercises 5.3: 12(a)(b), 13, 17, 21.

FINAL QUESTION: Prove that $\mathbb{Z}[i]/\langle 5-i \rangle \cong \mathbb{Z}_{26}$ by considering the homomorphism $\mathbb{Z} \rightarrow \mathbb{Z}[i]/\langle 5-i \rangle, n \mapsto n + \langle 5-i \rangle$ and using the first isomorphism theorem.