

MTH 4110: Abstract Algebra 2 - Spring Semester 2019

Problem List 6

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No Take-Home Problems, but study HW4 + HW5 + this sheet for Exam on 4/1!

1 Before Class On...

- Mon, 3/18: Read Chapter 18 to just before "Historical discussion Fermat's Last Theorem" (i.e. through proof of PID implies Irred=Prime)
- Mon, 4/8: Read rest of Chapter 18

2 Notation, Definitions, Theorems to Know

All items are exam-eligible!

- prime
- irreducible
- associates
- principal ideal domain (PID)
- statement of 18.1 (prime implies irreducible)
- statement of 18.2 (in PID, prime iff irreducible)
- know converse of 18.1 in general is false!
- know statement that in PID, an ideal is maximal iff it is generated by an irreducible element.

***More generally, you should know that in a PID, a irred $\iff a$ prime $\iff \langle a \rangle$ prime $\iff \langle a \rangle$ maximal, and know which implications hold for general integral domains and which do not.

3 For Practice...

- Ch. 18, 6th or 8th Edition: Problems 1-6, 10, 13, 14, 17-19
- Let D be an integral domain and let $a, b \in D$. Prove that $a \in \langle b \rangle$ if and only if $\langle a \rangle \subseteq \langle b \rangle$.
- Construct fields of size 4,8,9,27,25,125. Be sure to prove/fully explain why what you've constructed is a field (and of the correct size).

No problems to turn in for this list, but study the practice problems, defs, etc for exam!