

Math 357: Undergraduate Abstract Algebra 2. Instructor: Dr. C. Walton

Homework #10 on lecture material from M 4/5, W 4/7, F 4/9

Due: Wednesday, April 14, 2021 at noon *sharp* (better to submit early)

Include full statements of problems in your solution set.

See syllabus for grading guide and teaching page for writing tips

Please include your full name at the top of your homework set.

Practice Problems (discussed during class time)

- (1) [Mon] Dummit-Foote, Exercises §14.1 #2, 3
- (2) [Wed] (a) Dummit-Foote, Exercise §14.1 #5
(b) Show that $\text{Aut}(\mathbb{Q}(\sqrt[4]{2})/\mathbb{Q})$ is not the trivial group.
- (3) [Fri] Let ζ_n be a primitive n -th root of unity in \mathbb{C} . Show that $\text{Aut}(\mathbb{Q}(\zeta_n)/\mathbb{Q})$ is an abelian group.

Advanced Problems (completed outside of class time, and *can discuss in class if time permits)

- (A) [Mon*] Dummit-Foote, Exercise §14.1 #1
- (B) [Wed*] Let $F \subseteq E \subseteq K$ be a composition of field extensions so that E is normal over F .
Prove that if $\sigma \in \text{Aut}(K/F)$, then $\sigma(E) = E$.
- (C) [Fri*] Dummit-Foote, Exercise §14.1 #7