
Problem Set 8

Due: Thursday, March 22

Work all of the following problems. A subset of the problems will be graded. Be sure to adhere to the expectations outlined in the *General Problem Set Guidelines Sheet*.

Unless otherwise stated, all problems can be found in the appropriate *Exercises* sections of the text (*Abstract Algebra* by D. Dummit and R. Foote, 3rd Edition).

- Let $G \leq S_n$. Prove that

$$|G : G \cap A_n| = \begin{cases} 1 & \text{if } G \leq A_n, \\ 2 & \text{otherwise.} \end{cases}$$

– Note: There is a simple proof using the material from Section 3.5.

- Section 4.1 # 2, 3, 4, 7 parts (a), (b) and (c)
- Section 4.2 # 1