
Math 321: Foundations of Abstract Algebra

HOMEWORK 3 : DUE FEBRUARY 14

When Saracino says “Show that,” you can assume the problem means “Prove that”.

1. For each D_n prove that $r^i s = s r^{-i}$ for all positive integers i .
2. (a) Write out a complete Cayley table for D_3 (no words required for this part). **All of the entries in your table must be of the form $r^i s^j$.**
(b) Is D_3 abelian? Explain.
3. #5.2
4. #5.3
5. (a) #5.11
(b) Find an example of a group G where the elements of G that satisfy the equation $x^2 = e$ do not form a subgroup of G . Explain your example.
6. #5.22
7. #5.25 (I’m assigning problems about conjugates because they will become very important later in the semester.)
8. #5.29
9. # 7.1 f,h-j
10. # 7.7

Extra

1. We showed in class that D_n is not abelian for $n \geq 3$. What elements in D_n are in the center $Z(D_n)$? Prove your assertion for all $n \geq 3$.