

Due: Sep 19 2024

MTH 339 Algebra Homework 2

1. (10 pts) With pictures and words, describe each symmetry in D_3 .
2. (10 pts) Write out a complete multiplication table for D_3 . Is D_3 Abelian?.
3. (10 pts) Find elements A, B, C in D_4 such that $AB = BC$, but $A \neq C$.
4. (10 pts) Show that $\{1, 2, 3\}$ under multiplication modulo 4 is not a group, but that $\{1, 2, 3, 4\}$ under multiplication modulo 5 is a group.
5. (10 pts) Let a, b be elements of an Abelian group. Prove that $(ab)^n = a^n b^n$. Is this true for non-Abelian groups?
6. (10 pts) Prove that G is Abelian if and only if $(ab)^{-1} = a^{-1}b^{-1}$ for all $a, b \in G$.
7. (20 pts) Construct a Cayley table for $U(12)$.
8. (20 pts) Describe the symmetries of a nonsquare rectangle. Construct the corresponding Cayley table.