

MATH 301A FALL 2000 TEST #2

*Write clearly. Box or underline your final answers to computational questions.
All questions carry equal weight.*

1. List all 10 elements of the subgroup of S_5 generated by the subset $\{(12345), (25)(34)\}$. You must express each element as a product of disjoint cycles.
2. Let A be a normal subgroup of a group G , and let B be a normal subgroup of a group H . Show that $A \times B$ is a normal subgroup of $G \times H$.
3. Prove $\text{Aut}(\mathbb{Z}_6) \cong \mathbb{Z}_2$.
4. For odd n , prove that no non-identity element of the group \mathbb{Z}_n is its own inverse.