

1. Show that the direct sum is a coproduct in the category of Abelian groups.
2. Give an example of groups H_i, K_j such that $H_1 \times H_2 \simeq K_1 \times K_2$ and no H_i is isomorphic to any K_j .
3. Show that the group $\langle a, b | a^8, b^2 a^4, ab^{-1} ab \rangle$ has order at most 16.