33. Let \( G = \langle x, y \mid x^3 = y^3 = (xy)^3 = 1 \rangle \). Show that \( G \) is the semidirect product of \( A \) by \( \langle t \rangle \), where \( A = \langle a \rangle \times \langle b \rangle \) is the direct product of two infinite cyclic groups, \( t \) has order 3, and the action of \( t \) is given by \( a^t = b, b^t = a^{-1}b^{-1} \).

**Hint:** Show that \( \langle xyx, x^2y \rangle \) is a normal abelian subgroup.

34. Let \( G \) be a nonabelian simple group and \( \tilde{G} \) its universal covering group. Show that \( \text{Aut}(G) \cong \text{Aut}(\tilde{G}) \).

35. Let \( (G_i : i \in I) \) be perfect groups and \( \tilde{G}_i \) the universal covering group of \( G_i \). Show that the universal covering group of the direct product \( G \) of the groups \( G_i \) is the direct product of the covering groups \( \tilde{G}_i \) and hence that the Schur multiplier of \( G \) is the direct product of the Schur multipliers of the groups \( G_i \).

36. Show that a cyclic group has no nontrivial central extensions. Find all central extensions of the Klein 4-group \( C_2 \times C_2 \).