

1. Let $S = \{a, b, c\}$. Show that $(P(S), \subseteq)$ forms a poset, where $P(S)$ is the power set of S . Also draw the Hasse diagram representing this poset.
2. Prove that the set $G = \{ (\cos\theta + i \sin\theta) : \theta \text{ runs over all rational numbers} \}$ forms an infinite abelian group with respect to ordinary multiplication.
3. How many symmetric relations are possible on a set A with n elements?
4. In how many ways a graph containing n edges can be decomposed into pair of subgraphs?