
b. If every element of a group other than the identity has order two, prove that the group must be abelian (i.e. commutative).

c. Give an example of a group of finite order and an element of order 3 in it.
2. (30) State True or False. If true, prove it. If false, give an example to show that it is false.
   a. A group with 20 elements cannot have a subgroup with 6 elements.

   b. There is no group of order 45.

   c. All cyclic groups are abelian.

b. Prove that the center of a group is a normal subgroup.

c. Prove that the intersection of two normal subgroups of G is normal in G.
4. (20) Find the order of the following elements in $S_{12}$ and determine if they are odd or even. Find their inverses:
   a. $(2,3,1)(1,5,6,7)$
   b. $(2,6,8,4,5)(10,12,9)$