

**NB:** Please deposit your solutions in the appropriate box **by 4 p.m. on the due date.** Late assignments or assignments placed into incorrect boxes will not be marked. Use a mathematics department cover sheet. These are available from outside the Resource Centre. **PLEASE SHOW ALL WORKING.**

You are to work individually on assignments. You may do all your other work together. If we believe you have **worked together**, let alone **COPIED** someone else's script or let someone else **COPY YOUR SCRIPT**, then you will get **NO MARKS**.

1. Let  $A$  be a nonempty set. Show that the set of bijections  $f : A \rightarrow A$  is a group under composition.
2. Prove that if  $x^2 = e$  for all elements  $x$  of a group  $G$  with identity  $e$ , then  $G$  is abelian.
3. Let  $G$  and  $H$  be groups, and let  $f : G \rightarrow H$  be a homomorphism. Prove the image  $f(G)$  of  $f$  is a subgroup of  $H$ .