Marks for problem set 2 have been posted.
Some very quick notes:

(1) If G is an infinite group, then it is not guaranteed that there exists an element of infinite order. As an example, take the infinite direct sum of Z_2.

(2) If you're wanting to prove if and only if, be careful about contrapositives. For example, if you wanted to prove that G abelian implies the inversion map is an isomorphism, this is NOT equivalent to "G not abelian implies inversion not an isomorphism".
Remember: "A implies B" is equivalent to "Not B implies Not A".

(3) There are many ways to express the identity of S_n. Examples include (for sufficiently high n)
$e = (1) = (12)(12) = (3) = (123)(321) = (1)(2)(3)$ &c
The element (12345) in S_5, however, is not the identity. It's easy to see this, since the identity sends 1 to 1, and this permutation sends 1 to 2.

(4) If z is an element of a finite subgroup G in C^*, then Lagrange tells us that it satisfies $z^{|G|} = 1$. Bizarrely, a lot of people wrote it satisfied
$z|G| = 1$
Clearly for each $|G|$, there is only one solution to this, $z = 1/|G|$. (ranging over all $|G|$, an infinite number of solutions)