Group Theory, 2016

Exercise sheet 1 (hints)

Exercise 1. Explain first that the multiplication table for G must satisfy a 'sudoko' property.

Exercise 2. Read chapter 0 in the notes beforehand. Recall from the notes that all automorphisms $\mathbb{C} \to \mathbb{C}$ must fix all the rational numbers. There is also a well known automorphism that will give you one of the elements in the Galois group.

Exercise 4. There are two things that must be shown. Firstly that each element has a left inverse and secondly that there is a left identity. It is probably easier to work this out in this order.

Exercise 5. You need to go through all the ring axioms. Show first that associative law and the commutative law hold for the addition and show that there is a additive identity and that each element has an additive inverse.

Then move on to the multiplication. Show that ϵ is a multiplicative identity and that the multiplication satisfies the associative law (this is the hardest bit). Finally show that the distributive laws hold.