Group Theory, 2016

Exercise sheet 8 (hints)

Exercise 1. For (a) you are allowed to assume that we know from Algebra 2B that $\mathbb{H}$ is a ring. The only thing that remains then to show is that we have closure with respect to the inherited multiplication from $\mathbb{H}$ and that every element in Q has an inverse.

Exercise 2. Get a partition of X into disjoint oribits and apply the Orbit-Stabiliser Theorem.

Exercise 4. Write $X = N$ as a disjoint union of G orbits with respect to the conjugation action from G. Next imitate the proof of Theorem 5.1 from lectures.

Exercise 5. (b) Write X as a disjoint union of G-orbits. Observe that by the Orbit Stabiliser Theorem every orbit has either p elements or 1 element. Now notice that $|X|$ is divisible by p ...