1 quicknotesbcipaddied

(3) $\Rightarrow$ (1). Assume G/K coset mult is a grp. s.t. G to G/K

Remark:

given a group homomorphism $\phi : G \to H$, then $K = \ker(\phi)$ is a normal subgroup of G, and ϕ factors as $G \to G/K \to \Im(\phi) \hookrightarrow H$ a maps to aK maps to phi (a). This is the same grp. isomorphism from earlier.

Ex: S_3 are perm. of 1,2,3. iso. to D_3. Three transportations of swapping elements these correspond to reflections of a triangle and have order 2; we have two 3-cycles (correspond to rotationas and have order 3)