Topics covered for Exam 2 on Friday March 22

1 sec. 13

To study

Definitions: Homomorphism, image $\phi[A]$ etc., inverse image (even though ϕ has no inverse), range , kernel $Ker(\phi)$, 1-1 (injection), onto (surjection), normal subgroup ($HK = KH$), even or odd permutation,

Properties: Image of a group is a group, ditto for inverse images. Kernel is normal .

Read: Examples of homomorphisms, Theorem 13.15 $\phi^{-1}[\{\phi(x)\}]$, test for 1-1 homomorphism, test for onto homomorphism, test for isomorphism, $\sigma \mapsto sgn(\sigma)$ is a homomorphism into (an isomorphic copy of) $\mathbb{Z}_2$

2 sec. 14

To study

Definitions: Factor (or quotient) group from cosets of a normal subgroup, inner automorphism (conjugation), automorphism, torsion subgroup

Properties: G/H is isomorphic to the image of a homomorphism with kernel H, Fundamental homo. theorem: If ϕ is a surjection of group G onto G', then $G/H \approx G'$.

Read: Various examples of factor groups

3 sec. 16

To study

Definitions: Action of group on a set, faithful action, transitive action, isotropy subgroup, orbits and resulting equivalence classes

Properties: G acting on a set X gives a homomorphism of G into S_X, for each $x \in X$ $G_x = \{\sigma \in G \mid \sigma(x) = x\}$ is a subgroup of G, important theorem $|G_x| = (G : G_x)$.

Read: Various examples of Group actions