

Math 421 Problem Set
October 6, 2022

1. Let $\phi : G \rightarrow H$ be a homomorphism.

(a) Let $K \leq H$. Show that $\phi^{-1}(K) \leq G$.

(b) If $G = \mathbb{Z}$ and $H = Z_{12}$, define the homomorphism $\phi : G \rightarrow H$ by $\phi(n) = x^n$. For each subgroup $K \leq Z_{12}$, find $\phi^{-1}(K)$.