Homework 11
Due Date: April 30

Book Problems for HW #11

Chapter 16: B1-3, D6, D7, F6, H1-7, I5

Supplementary Problems for HW #11

Problem 1: Let $G$ and $H$ be groups with identities $e_G$ and $e_H$, respectively. Show that $(G \times H)/(G \times \{e_H\}) \cong H$.

Problem 2: Let $G$ be a group and suppose $f : G \to \mathbb{Z}_6 \times \mathbb{Z}_2$ is an onto homomorphism such that $|\text{Ker } f| = 5$. Explain why $G$ must have normal subgroups of orders 5, 10, 15, 20, 30, and 60.

Problem 3: Given a group $G$ and $H, K \leq G$, we say that $G$ is an internal direct product of $H$ and $K$, denoted, by $G = H \otimes K$ if $G = HK$ and $H \cap K = \{e\}$. Show that if $G = H \otimes K$ and $p$ is prime, then $G^p = H^p \otimes K^p$, where for any group $X$ and $m \in \mathbb{N}$, $X^m = \{a^m \mid a \in X\}$.