Extra Problems for HW #11

Problem 0: Explain the difference between a function being one-to-one and a function being well-defined. When should one show that a function is well-defined?

Problem 1: Suppose that $G$ is a group with a subgroup $K$ and a normal subgroup $N$.

(a) Show that $K \cap N \triangleleft K$.

(b) Show that $K/(K \cap N) \approx KN/N$.

Problem 2: Let $G$ be a group with normal subgroups $N, K$ such that $K$ is a subgroup of $N$.

(a) Show that $K \triangleleft N$.

(b) Show that $N/K \triangleleft G/K$.

(c) Show that $(G/K)/(N/K) \approx G/N$. 