Math 4320 HW4 due March 13, 2013

1. Problem 2.92, pg. 171 of the text

2. Problem 2.113 pg. 192 of the text.

3. Let \((G, \star)\) and \((H, \otimes)\) be groups and let \(f : H \to \text{Aut } G\) be a homomorphism. Define a binary operation \(\oplus\) on the set \(G \times H\) by

\[
(g_1, h_1) \oplus (g_2, h_2) = (g_1 \star f(h_1)(g_2), h_1 \otimes h_2).
\]

Prove that \((G \times H, \oplus)\) is a group.

4. Denote the group constructed in the previous exercise by \(G \times_f H\). For all \(n \geq 3\) find \(f_n\) such that \(D_{2n} \simeq I_n \times_f I_2\).

5. Problem 2.115, pg. 207 of the text.

6. Problem 2.126 pg. 207 of the text