Math 542-Modern Algebra II

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Problem:
(Mon Feb 3) Suppose G_1, G_2, H_1, H_2 are finite abelian groups, $G_1 \times G_2 H_1 \times H_2$ and $G_1 H_1$. Prove that $G_2 H_2$.

Give a counterexample if the word finite is dropped, i.e., $G_1 \times G_2 H_1 \times H_2$ and $G_1 H_1$ but G_2 is not isomorphic to H_2.

Solution:
Solution goes here!