14.9) Given that G, H, K are finite abelian groups and $G \times H \cong G \times K$. Then, using thm 14.2,

G is determined by $p_1 < p_2 < \dots p_m$* attatched with $\Pi_1, \Pi_2, \dots \Pi_m$ where $\Pi_i = (0)$ if $p_i \nmid |G|$. Then

H is determined by $p_1 < p_2 < \dots p_m$ attatched with $\Pi'_1, \Pi'_2, \dots \Pi'_m$ where $\Pi_j = (0)$ if $p_j \nmid |H|$.

Similarly for K.

Then $G \times H$ is determined by $p_1 < p_2 < \dots p_m$ attatched with $\pi_1, \pi_2, \dots \pi_m$ where π_i = the set of all elements in Π_i and all elements in Π'_i.

Similarly for $G \times K$.

So, by thm 14.3, the invariants for $G \times H$ are the same as those for $G \times K$, and because each are unique and determined in the way shown above, then the invariants of H equal the invariants of K, so, by thm 14.3, $H \cong K$.

* Note: Let $p_1 < p_2 < \dots < p_m$ be all of the primes that make up $|G|$, $|H|$, and $|K|$

Group 5
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