Name: _____

Read Section 9.2, on external and internal direct products.

Reading Questions

1. Make sure you know the definitions of external and internal direct products as well as the results about orders of elements in a direct product (Theorem 9.17) and direct products of cyclic groups (Theorem 9.21).

2. (a) List the elements of $\mathbb{Z}_3 \times \mathbb{Z}_3$, along with their orders.

   (b) Is this group isomorphic to $\mathbb{Z}_9$? Why or why not?

3. (a) List the elements of $\mathbb{Z}_3 \times \mathbb{Z}_4$, along with their orders.

   (b) Is this group isomorphic to $\mathbb{Z}_{12}$? Why or why not?

4. True or false with explanations.

   (a) The group $\mathbb{Z}_n \times \mathbb{Z}_m$ is isomorphic to $\mathbb{Z}_{nm}$.

   (b) A group G is the internal direct product of its subgroups H and K if $G = HK$.

   (c) If a group G is the internal direct product of its subgroups H and K, then $G \cong H \times K$.

5. What struck you in this reading? What is still unclear? What remaining questions do you have?