

7. D_{12} has an element of order 12 and S_4 does not.
19. Note that both H and K are isomorphic to the group of all permutations on the four symbols, which is isomorphic to S_4 . The same is true when 5 is replaced by n since both H and K are isomorphic to S_{n-1} .
31. The inverse of a one-to-one function is one-to-one. For any $g \in G$ we have $\phi^{-1}(\phi(g)) = g$ and therefore ϕ^{-1} is onto. To verify that ϕ^{-1} is operation preserving see the answer to Exercise 15 of this chapter.
32. Since $\phi(K)$ contains $\phi(e)$, $\phi(K) \neq \emptyset$. Also,
 $\phi(a)(\phi(b))^{-1} = \phi(a)\phi(b^{-1}) = \phi(ab^{-1}) \in \phi(K)$.
34. $U(20)$ has three elements of order 2 whereas $U(24)$ has seven.