Section 2.5 Exercises
Hertein's Topics In Algebra

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February 28, 2016

Understanding Theorem 2.5.1

Here, a leap was made for me in realizing that for every $h_1, h_2 \in H \cap K$, we have $hh_1 \neq hh_2$ and $h_1^{-1}k \neq h_2^{-1}k$. This is obvious by the cancelation proprety. So what he does is show that $o(H \cap K)$ duplicates of the element hk exists in the $o(HK)$ possible multiplications of an element taken from H with that of K. He then shows that this lower bound is also an upper bound, and the rest goes through.