Homework

Ding Yaoyao, 516030910572

2017-09-22

Exercise 1-3

5

- Closure: If $a, b \in G$, there are $c, d \in G$ such that $a = c^m, b = d^m$. Then $ab = c^m d^m = (cd)^m \in G$(Beacuse group G is an abelian group).
- Identity: $e = e^m \in G$.
- Inverse: If $a = b^m \in G$, then $a^{-1} = (b^m)^{-1} = (b^{-1})^m \in G$.

Above all, $H \preccurlyeq G$.

6

For all $a, b \in gHg^{-1}$, there are $c, d \in H$ such that $a = gcg^{-1}, b = gdg^{-1}$.
Then $a^{-1}b = (gcg^{-1})^{-1}gdg^{-1} = gc^{-1}g^{-1}gdg^{-1} = gc^{-1}dg^{-1}$.
Beacuse $c^{-1}d \in H$, we have $a^{-1}b \in gHg^{-1}$.
Finally, we get $gHg^{-1} \preccurlyeq G$.

7

8

18

19