Quiz 11 MTH450/550

Sunday, November 12, 2023 8:56 AM

$G = \mathbb{Z}_{18}$, $H = \langle 3 \rangle$, $K = \langle 6 \rangle$

First,

$H = \langle 3 \rangle = \{3, 6, 9, 12, 15, 0\}$

$K = \langle 6 \rangle = \{6, 12, 0\}$

$(G:K)$ = # cosets of K in G = 6

- $\langle 6 \rangle$ itself
- $1\langle 6 \rangle = \{7, 13, 1\}$
- $2\langle 6 \rangle = \{9, 14, 2\}$
- $3\langle 6 \rangle = \{10, 15, 3\}$
- $4\langle 6 \rangle = \{11, 16, 4\}$
- $5\langle 6 \rangle = \{12, 17, 5\}$
- $6\langle 6 \rangle = \{13, 0, 6\}$

Come from G

$(G:H)$ = # cosets of H in G = 3

- $\langle 3 \rangle$ itself
- $1\langle 3 \rangle = \{4, 7, 10, 13, 16, 1\}$
- $2\langle 3 \rangle = \{5, 8, 11, 14, 17, 2\}$
- $3\langle 3 \rangle = \{6, 9, 12, 15, 0, 3\}$

$(H:K)$ = # cosets of K in H = 2

- $\langle 6 \rangle$ itself
- $3\langle 6 \rangle = \langle 9, 15, 3 \rangle$
- $6\langle 6 \rangle = \langle 12, 0, 6 \rangle$

Comes from H

Thm 10.14

$$(G:K) = (G:H)(H:K)$$

Is it true?

$6 = 3 \cdot 2$ yes!