TOPIC:9- Cosets

Cosets

(1) **Left coset of H in G**

Let $(H, *)$ be a subgroup of $(G, *)$.

For any $a \in G$, the left coset of H, denoted by $a * H$, is the set

$$a * H = \{ a * h : h \in H \} \quad \forall\ a \in G.$$

(2) **Right coset of H in G**

The right coset of H, denoted by $H * a$, is

$$H * a = \{ h * a : h \in H \} \quad \forall\ a \in G$$

① Find the left cosets of the subgroup $H = \{[0], [3]\}$ of the group $[Z_6, +_6]$.

Let $Z_6 = \{0, 1, 2, 3, 4, 5\}$

$H = \{0, 3\}$

$0 + H = \{0, 3\} = H$

$1 + H = \{1, 4\}$

$2 + H = \{2, 5\}$

$3 + H = \{0, 3\} = H$

$4 + H = \{4, 1\} = 1 + H$

$5 + H = \{5, 2\} = 2 + H$

$\therefore$ $0 + H$, $1 + H$ and $2 + H$ are three distinct left coset of H.