

Recall:

Definition: Let $H \leq G$. For any $a \in G$, the set $aH = \{ah|h \in H\}$ is the **left coset of H in G containing a** . Similarly, $Ha = \{ha|h \in H\}$ is the **right coset of H in G containing a** .

Example: Let $G = \{e, x, x^2, x^3\} = \langle x \rangle$. Then $H = \{e, x^2\} = \langle x^2 \rangle$ is a subgroup of G .

On October 18th, we found the left cosets of H to be:

$$eH = \{e, x^2\} = x^2H$$

$$xH = \{x, x^3\} = x^3H$$

Recall: Just because $aH = bH$ does not mean $ah = bh$ for all $h \in H$. In our above example, $xH = x^3H$, but $xh \neq x^3h$ for all $h \in H$. Specifically, $x * e = x^3 * x^2$, $x * x^2 = x^3 * e$.