Definition. group A : $G = (A, \cdot)$

Closure. : $a_1, a_2 \in A$ $a_1 \cdot a_2 \in A$

Associativity. : $a, b, c \in A$ $a \cdot (b \cdot c) = (a \cdot b) \cdot c$

Identity. $e \in A$ $e \cdot a = a \cdot e = a$

Inverse. $a^{-1} \in A$ a. $a \cdot a^{-1} = a^{-1} \cdot a = e$

commutativity **NOT** $a, b \in A$ $a \cdot b = b \cdot a$

abelian

$G = (Z, +)$

$G = (, \times)$ 0 ± 1

$G = (, \times)$ 0

$G = (, +)$

$G = (\{set of all 2-by-2 matrices with integer elements\}, \cdot)$

$G = (\{set of all 2-by-2 matrices with determinant 1\}, \cdot)$ $SL(2)$

Definition. subgroup H G $H = (B, \cdot)$ $B \subseteq A$ H $(5, +)$ $(, +)$

Defintion. coset $a \cdot H$ H $\{a \cdot h | h \in H\}$ $a \in G$

$2 + 5 = \{2, 7, 12, 17, \ldots, -3, -8, -13, -18 \ldots\}$ $\equiv 25$

not $a \cdot H \cap b \cdot H = \emptyset$ $a \neq b$ $2+$