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نظرية التمثيل

Representation Theory

Def: A pair $(G,\cdot)$ of a nonempty set G and binary operation $(\cdot)$ [multiplication] is called a group if it satisfy the following:

(1) $x\cdot y\in G$ $\forall x,y\in G$ (closure)

(2) $(x\cdot y)\cdot z = x\cdot(y\cdot z)$ $\forall x,y,z\in G$ (associative)

(3) $\exists!$ (there exist a unique) $e\in G$ such that $x\cdot e = e\cdot x = x$ $\forall x\in G$. (e is called identity)

(4) $\forall x\in G$, $\exists!$ $x^{-1}\in G$ such that $x\cdot x^{-1} = x^{-1}\cdot x = e$ (x^{-1} called inverse of x)

Examples: 1- $(\mathbb{R},+)$, $(\mathbb{R},\cdot)$, $(\mathbb{Z},+)$, $(\mathbb{Z},\cdot)$ form a groups (check!).

2- $G=\{e,a,b,ab\}$ with multiplication table

	e	a	b	ab
e	e	a	b	ab
a	a	e	ab	b
b	b	ab	e	a
ab	ab	b	a	e

this group usually denoted by V_4 and called Klein 4-group