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Def: action of group: (right action)

Let G be a finite group (or even infinite) and Ω be a set of points, we say that G acts on Ω from the right if $\exists$ a map $\psi: \Omega \times G \to \Omega$

$\psi(x,g) = x^g$

$\forall x \in \Omega, g \in G$

s.t

$$(x^g)^h = x^{(gh)} \quad \forall g, h \in G$$

$$x^e = x \text{ , } e \text{ is the identity of } G.$$

Remark: we can define left and two-sided actions by the same way'

Def: Let G be a group acts on Ω, then we define the orbit of $x \in \Omega$ by $x^G = orb(x) = \{x^g \mid g \in G\}$

Def: Let G be a group acts on Ω and $x \in \Omega$ we define stabilizer of x in G by:

$$G_x = Stab_G(x) = \{g \in G \mid x^g = x\}.$$