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Cyclic Group

Order of an ~~elem~~ element:

Let G be a group and $a \in G$ be any element.
We say a is of Order n if n is the least +ve inter s.t. $a^n = e$ if binary composition of G is denoted by '+' this would read as
$na = 0$ where 0 is identity of G.

If it is not possible to find such n

we say a has infinite Order. Order of a will be denoted by $o(a)$
$o(a) = 1$ iff $a = e$

Cyclic Group — A Group G is said to be cyclic Group if $\exists$ an element $a \in G$, such that every element of G can be expressed as a power of a.
'a' is called Generator of G.

$G = \langle a \rangle$ or $G = \{a\}$

Example of cyclic group

(1) The Group of integers under addition 1 being its generator

(2) The Group $G = \{1, -1, i, -i\}$ under multiplication is cyclic as we express its member i, i^2, i^3, i^4