

Cyclic Group Order of an element:

Let G be a group and $a \in G$ be any element.

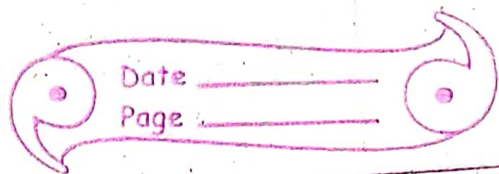
We say a is of order n if n is the least +ve inter s.t. $a^n = e$ if binary composition of G is denoted by '+' this would read as $na = 0$ where 0 is identity of G .

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 .

$$G = \langle a \rangle \quad \text{or} \quad G = \{a^n\}$$



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