Abstract algebra

Complex of a Group

Any non-empty subset H of G is called a complex of the group G.

SUBGROUPS :- A non-empty subset H of a group G is called a subgroup of G if H itself a group with respect to the operation defined in G.

Remarks

- The two subgroups, G and $\{e\}$ of the group G are called Improper (or trivial) subgroup of G. Any subgroups other than these two subgroups is called proper (or non-trivial) subgroups.
- It is clear that, if H is a subgroup of G and K is subgroup of H, then K is a subgroup of G.
- Every subgroup of G is a Complex of G, but every Complex is not always a subgroup.

Some examples of subgroups

(i) $(\{1, -1\}, \cdot)$ is a subgroup $(\{1, -1, i, -i\}, \cdot)$

(ii) $(Z, +)$ is a subgroup of $(Q, +)$

(iii) $(Q, +)$ is a subgroup of $(R, +)$

(iv) The set of all non-singular matrices with real elements whose determinant value are 1, is a subgroup of multiplicative group of all non-singular $n \times n$ matrices.

(v) The multiplicative group of positive rational numbers is a subgroup of the multiplicative group of all non-zero rational numbers.