Algebraic Structures

G -> a non-empty set.

G with one or more binary operations is known as algebraic structures.

For examples

1) (G, *) , where '*' is an binary operation on Set/Group 'G'. Than (G,*) is an algebraic group.

2) (N, +), where '+' is an binary operation on Set/Group 'N',set of natural numbers.

3) (I, +), where '+' is an binary operation on Set/Group 'I', set of integer numbers.

4) (I, –), where '-' is an binary operation on Set/Group 'I', set of integer numbers.

5) (R, +, *), where ' + ' and ' * ' are two binary operations on Set/Group 'R', set of real numbers.

6) (R, +, .)

7) (I, +, .) etc.

Properties of an Algebraic Structure

1) Associative and Commutative Laws

(a * b)* c = a * (b * c)

(a * b) = (b * a)

2) Identity element and Inverses

a * e = e * a = a, where e à identity element

Left identity element,
e * a = a.

Right identity element,
a * e = a.

If an binary operation ‘ * ‘ is not having an identity element,
Than,
inverse of an element ‘a’ in set is ‘b’.

a * b = b * a = e

3) Cancellation Laws

Left cancellation law:
a * b = a * c, implies b = c (‘a’ of both sides get cancelled).

Right cancellation law:
b * a = c * a, implies b = c (‘a’ of both sides get cancelled).