Notations :

$\mathbb{Z}$ → the set of all integers
$\mathbb{Q}$ → the set of all rational numbers
$\mathbb{R}$ → the set of all real numbers
$\mathbb{R}^+$ → the set of all positive real numbers
$\mathbb{Q}^+$ → the set of all positive rational numbers
$\mathbb{C}$ → the set of all complex numbers.

Semigroup :

If a non empty set S together with the binary operation (*) satisfying the following properties.

i). closure property
ii). Associative property, is called semigroup

Monoid :

A non empty set M together with the binary operation (*) satisfying the following properties.

i). closure
ii). Associative
iii). Identity, is called monoid.

Examples :

1]. $(\mathbb{Z}, \rightarrow)$ is the example of quasi group. (closure)
2]. $(N, +)$ → semigroup [closure & Associative]
3]. Since '0' is not a natural no., here '0' is the identity.
4]. $(N, *)$ → monoid [closure, Associative & Identity]
Since fraction does not exists in Natural No's.
5]. $(\mathbb{Z}, +)$ → Group & Abelian group
[closure, Associative, Identity, Inverse & Commutative]

Order of a group :

The number of elements in a group G is called the order of a group & is denoted by $O(G)$
i). If $O(G)$ is finite, then G is said to be finite group.
ii). If $O(G)$ is infinite, then G is said to be infinite group.