

(3) Bounded & Unbounded sets: Supremum, Infimum

A subset S of real numbers is said to be bounded above if $\exists$ a real number k such that every member of S is less than or equal to k ; i.e.,

$$x \leq k, \forall x \in S$$

The number k is called an upper bound of S .

If no such number k exists, the set is said to be unbounded above or not bounded above.

The set S is said to be bounded below if $\exists$ a real number k such that every member of S is greater than or equal to k ; i.e.,

$$k \leq x, \forall x \in S.$$

The number k is called a lower bound of S . ~~if no~~

If no such number k exists, the set is said to be unbounded below or not bounded below.

"A set is said to be bounded if it is bounded above as well as below."

→ It may be seen that if a set has one upper bound, it has infinite number of upper bound.

→ for example; if k is an upper bound of a set S then every number greater than k is also an upper bound of S , thus every set S bounded above determines