[] Let S be any non-empty subset of $\mathbb{R}$. The set of

- *upper bounds* of S is $U(S) = \{u \in \mathbb{R} : u \geq s \ \forall \ s \in S\}$.
- *lower bounds* of S is $L(S) = \{l \in \mathbb{R} : l \leq s \ \forall \ s \in S\}$.

[] Let S be any non-empty subset of $\mathbb{R}$. Then

- the *supremum of S in* $\mathbb{R}$ is the unique smallest element in $U(S)$.
- the *infimum of S in* $\mathbb{R}$ is the unique largest element in $L(S)$.
- the supremum and infimum of S always exist.
- the supremum (infimum) is also referred to as the least upper bound (greatest lower bound).

[] Let S be any non-empty subset of $\mathbb{R}$. Then

- a *maximum of S in* $\mathbb{R}$ is an element $s^* \in S$ with $s^* \geq s \ \forall s \in S$.
- a *minimum of S in* $\mathbb{R}$ is an element $s_* \in S$ with $s_* \leq s \ \forall s \in S$.
- a maximim and/or minimum of S may not exist.