Definition :- Suppose that S is an ordered set, and $E \subseteq S$. If there exists $b \in S$ such that i. $x \le b$ for every $x \in E$, we say that E is bounded above, and call b is an upper bound of E.

ii $x \ge b$ for every $x \in E$, we say that E is Lower bounded and call b is an Lower bound of E.

i.e ① S is order set and $E \subseteq S$ then E is bounded above if $\exists\, b \in S$ s.t $x \le b \;\; \forall x \in E$

ⅱ S is order set and $E \subseteq S$, then E is bounded below if $\exists\, b \in S$ s.t $b \le x \;\; \forall x \in E$.

Ex :- ① Let $S = \mathbb{Q}$, $E = \{2, 3, 4, 5, 6, 7\}$.

Then The upper bounds are $7, 8, 9, 10, \ldots$

and the Lower bounds are $2, -1, 0, -1, -2, \ldots$

$\therefore$ E is bounded above and bounded below.

② Let $S = \mathbb{Z}$, $E = \{\ldots, -3, -2, -1, 0, 1\}$

Then the upper bound are $1, 2, 3, 4 \ldots$

since $1 \in \mathbb{Z}$ and $1 \ge x \;\; \forall x \in E$

and E is bounded above.

but E is not bounded below since $\nexists\, b \in S$ s.t