Th. 6. If $\{a_n\}$ is any sequence then lim.

Examples on lim sup and lim inf

Ex ① If $a_n = (\cancel{-1}) \sin \frac{n\pi}{3}$, $n \in N$,
Then the sequence $\{a_n\}$ is
$\{\frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{2}, 0, -\frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}, 0, \frac{\sqrt{3}}{2}\}$.
$A_n = -\frac{\sqrt{3}}{2}$, and $A_n = \frac{\sqrt{3}}{2}$ for each $n \in N$. ∴ $\underline{\lim}\, a_n = -\frac{\sqrt{3}}{2}$ and $\overline{\lim}\, a_n = \frac{\sqrt{3}}{2}$.

If $a_n = \sin\frac{n\pi}{2} + \frac{(-1)^n}{n}$, $n \in N$, then show that $\underline{\lim}\, a_n = -1$ and $\overline{\lim}\, a_n = 1$

The sequence $\{a_n\}$ is bounded for $-\frac{1}{3} \le a_n \le 1$ The terms of the sequence is given by $a_{2n} = \frac{1}{2n}$ for each $n \in N$

$a_{4n+1} = 1 - \frac{1}{4n+1}$ ∀ n.

$a_{4n+3} = -1 - \frac{1}{4n+3}$ ∀ n.