Section 9.2 Monotone Sequences

Definition A sequence $\{a_n\}$ is called increasing if $a_n < a_{n+1}$ for all $n \geq 1$, that is, $a_1 < a_2 < a_3 < \cdots$. It is called decreasing if $a_n > a_{n+1}$ for all $n \geq 1$. A sequence is monotonic if it is either increasing or decreasing.

Definition A sequence $\{a_n\}$ is bounded above if there is a number M such that $a_n \leq M$ for all $n \geq 1$. It is bounded below if there is a number m such that $m \leq a_n$ for all $n \geq 1$. If it is bounded above and below, then $\{a_n\}$ is a bounded sequence.

Monotonic Sequence Theorem Every bounded, monotonic sequence is convergent.