Chapter 10.9–10.10 notes

⇒ Recall that if a series is bounded and monotonic, then it converges to a limit.

n^{th} term test

⇒ If $\lim_{n\to\infty} c_n \neq 0$, or does not exist, then the series $\sum_{i=1}^{\infty} c_n$ diverges

Integral Test

⇒ You may denote the terms in a series $c_n \to f(n)$ for $f(x)$ continuous, positive, decreasing function for $x \geq 1$. The series converges if and only if $\int^{\infty} f(x)\,dx$ converges.

⇒ This is true because the partial sums of the sequence formed by the series are bounded, this may be proven using concept of integral area, however its upper bound should be → $U = f(1) + k$, $k = \int^{\infty} f(x)\,dx$. Since terms of sequence $\{c_n\}$ are positive, the partial sums $\{S_n\}$ are ↑, thus → monotonic + bounded = convergent $\{S_n\}$

Recall

⇒ S_n repersents the partial sum of the series → $\sum_{k=1}^{n} c_n$ and thus →