Lecture 16

11.3 The Integral Test

Definition 1. The series $\sum_{n=1}^{\infty} a_n$ where $a_n > 0$ for any integer $n \geq 1$, is said to be a **positive series**.

Theorem 1. The Integral Test
Suppose $a_n = f(n)$ where f is positive continuous and non-increasing on interval $[N, \infty)$ for some positive N. Then $\sum_{n=1}^{\infty} a_n$ and $\int_N^{\infty} f(x)dx$ either both converge or both diverge to infinity.

p-Series

Definition 2. The series of the form $\sum_{n=1}^{\infty} \frac{1}{n^p}$ is called the p-**series**.

Statement 1. The p-series is convergent if $p > 1$ and divergent if $p \leq 1$.