

Lesson 10.7: Integral Test and p -Series

Integral Test

Note:

Examples: Use the integral test to determine the convergence or divergence of these series.

1. $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$

2. $\sum_{n=2}^{\infty} \frac{1}{n \ln(n)}$

3. $\sum_{n=1}^{\infty} \frac{1}{n}$

4. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$

5. $\sum_{n=1}^{\infty} \frac{1}{n^2}$

p -Series and Harmonic Series

If p is a _____, then $\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} + \dots$ is called a p -Series.

Examples _____, _____, & _____ were all examples of p -Series.

p -Series Test

Harmonic Series

The **harmonic series** is the p -Series in which $p = 1$:

Examples:

1. $1 + \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} + \frac{1}{4\sqrt{4}} + \dots$

2. $\sum_{n=1}^{\infty} n^3 \sqrt[3]{n^{-11}}$