1 10.2: Series

Definitions:

Infinite Series:

\[ \sum_{n=1}^{\infty} a_n \]

Nth Partial Sum:

Convergent Series:

Divergent Series:

Special (Summable) Kinds of Series:

Geometric Series:

Find the values of \( r \) for which \( \sum_{n=1}^{\infty} a r^{n-1} \) is convergent and find the sum.
Telescoping Series:

Find the sum of \( \sum_{n=1}^{\infty} \left( \frac{1}{n} - \frac{1}{n+2} \right) \)

Properties of Convergent Series:

If \( \sum_{n=0}^{\infty} a_n \) and \( \sum_{n=0}^{\infty} b_n \) are convergent, then:

i) 

ii) 

iii)
Tests for Convergence of Series: (continued through 10.4)

I. The Test for Divergence (or Divergence Test):

\[ \sum_{n=0}^{\infty} \frac{n + 3}{2n + 1} \]

(A DIFFERENT LOOK): Suppose \( s_N = \sum_{n=0}^{N} a_n = \frac{N + 3}{2N + 1} \). What do we know about \( \sum_{n=0}^{\infty} a_n \)?

Prove the converse of the Test for Divergence is false by showing that \( \sum_{n=1}^{\infty} \frac{1}{n} \) diverges.