1 10.2: Series

Definitions:

Infinite Series:

Nth Partial Sum:

Convergent Series:

Divergent Series:

Special (Summable) Kinds of Series:

Geometric Series:

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

Find the sum of \( \sum_{n=1}^{\infty} \left( \frac{1}{n} - \frac{1}{n+3} \right) \)

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):

\[ \sum_{n=1}^{\infty} \frac{\sqrt{n-1}}{n} \]

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

A proof that the converse of the Test for Divergence is false: \( \sum_{n=1}^{\infty} \frac{1}{n} \) diverges even though the terms \( \left( \frac{1}{n} \right) \) approach 0.