***INFINITE SERIES AND CONVERGENCE TESTS***

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|  is an infinite **series**. Let  be the N-th partial sum. Then the *series*  converges if the *sequence*  converges, and diverges if that sequence diverges. |
| **Geometric Series:** * If  the series converges to
* If  the series diverges

Example:  | **Harmonic Series:** The harmonic series, strangely enough, diverges.Example:  |
| **p-Series:** * If  the series converges
* If  the series diverges

**Example:**  converges | **Telescoping Series:** A series where adjacent terms cancel out. Involves  as a difference of two terms, sometimes as a result of Partial Fraction Decomposition.**Example:**  |
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| **Divergence Test**: If  then diverges**Example:**  diverges | **Limit Comparison Test**: If  and  are two sequences such that  exists and is not zero, then the two series  and  are comparable, i.e. they either both converge or both diverge.**Example:**  and  both converge |
| **Ratio Test**: For  and compute * If  the seriesconverges
* If  the series  diverges
* If  there is no information

**Example:**  converges | **Integral Test:** Suppose  is decreasing and. Let  be a function such that . Then  converges if and only if  converges.**Example:**  and  both diverge |