

Comparing Convergence Tests

Partner up with a classmate as instructed by your teacher. With your partner, you are going to be exploring the different convergence tests you have discovered in this module. For each of the following series, apply the stated convergence test to determine whether the series converges. For each series, compare **1)** whether or not the convergence test worked, and **2)** how much work it was to apply the test.

Series	Person 1	Person 2
$\sum_{n=1}^{\infty} \frac{\ln n}{n^3}$	Ratio Test	Comparison Test (to $\frac{1}{n^2}$)
$\sum_{n=1}^{\infty} \frac{n^{2n}}{(n^2+1)^{4n}}$	Ratio Test	Root Test
$\sum_{n=1}^{\infty} 3\left(\frac{5}{6}\right)^n$	Root Test	Geometric Series
$\sum_{n=1}^{\infty} \frac{1}{n^3} \sin\left(\frac{1}{n^2}\right)$	Comparison Test (to $\frac{1}{n^3}$)	Integral Test
$\sum_{n=1}^{\infty} \frac{(-1)^n n}{3n+1}$	Alternating Series Test	Ratio Test

For most series, there are multiple ways to check for convergence. With practice, you can usually decide which test to take just by looking at the form of the series, but if your first test does not work (or is becoming too complicated), try a different test.