Summary of Convergence and Divergence Tests			
Test	**Series**	**Convergence/Divergence**	**Comments**
nth term	$\sum a_n$	Diverges if $\lim_{n\to\infty} a_n \neq 0$	If $\lim_{n\to\infty} a_n = 0$, need another test
Geometric Series	$\sum_{n=1}^{\infty} ar^{n-1}$	Diverges if $\lvert r\rvert \geq 1$ Converges if $\lvert r\rvert < 1$	If $\lvert r\rvert < 1$, converges to $S = \frac{a}{1-r}$
$p-$series	$\sum_{n=1}^{\infty} \frac{1}{n^p}$	Diverges if $p \leq 1$ Converges if $p > 1$	Harmonic Series when $p = 1$
Integral Test	$\sum_{n=1}^{\infty} a_n$	Diverges if $\int^{\infty} a_n \, dn$ diverges Converges if $\int^{\infty} a_n \, dn$ converges	a_n must be positive, continuous, and decreasing
Comparison Test	$\sum^{\infty} a_n, \sum^{\infty} b_n$ $a_n > 0$ and $b_n > 0$	If $\sum^{\infty} b_n$ converges and $a_n \leq b_n$ for all n, then $\sum^{\infty} a_n$ converges If $\sum^{\infty} b_n$ diverges and $a_n \geq b_n$ for all n, then $\sum^{\infty} a_n$ diverges	$\sum^{\infty} b_n$ is often a $p-$series or geometric series
Special (Limit) Comparison Test	$\sum^{\infty} a_n, \sum^{\infty} b_n$ $a_n > 0$ and $b_n > 0$	If $\lim_{n\to\infty} \frac{a_n}{b_n} = L > 0$, then both converge or both diverge	L is a finite number
Alternating Series	$\sum^{\infty} (-1)^n a_n$ $a_n > 0$	Converges if $\lim_{n\to\infty} a_n = 0$ and $a_{n+1} \leq a_n$	Terms must alternate!
Absolute Convergence	$\sum^{\infty} a_n$	If $\sum^{\infty} \lvert a_n\rvert$ converges, then $\sum^{\infty} a_n$ converges If $\sum^{\infty} \lvert a_n\rvert$ diverges, then we need another test for $\sum^{\infty} a_n$	Absolute convergence implies convergence
Ratio Test	$\sum^{\infty} a_n$	If $\lim_{n\to\infty} \left\lvert \frac{a_{n+1}}{a_n} \right\rvert = L$ or ∞, then Diverges if $L > 1$ or ∞ Converges if $L < 1$ Inconclusive if $L = 1$	Useful if a_n involves factorials or nth powers