Summary of Tests for Convergence of Series			
Test	*When to use*	*Conclusions*	Lecture Week
Test for Divergence	All series	$\lim_{n\to\infty} a_n \neq 0 \implies$ divergent	10
Geometric series	$\sum ar^{n-1}$ where $a \neq 0$	$\lvert r\rvert < 1$: $\sum_{n=1}^{\infty} ar^{n-1} = \frac{a}{1-r}$ $\lvert r\rvert \geq 1$: divergent	10
p-series	$\sum \frac{1}{n^p}$	$p > 1$: convergent $p \leq 1$: divergent	10
Integral Test	$f(n) = a_n$ with f cont., decreasing and positive	$\sum_{n=1}^{\infty} a_n$ and $\int_1^{\infty} f(x)\,dx$ both converge or both diverge	Not tested
Comparison Test	$0 \leq a_n \leq b_n$	$\sum b_n$ converges $\implies \sum a_n$ converges $\sum a_n$ diverges $\implies \sum b_n$ diverges	10
Limit Comparison Test	$a_n, b_n > 0$ and $\lim_{n\to\infty} \frac{a_n}{b_n} = L$	$L > 0$: $\sum a_n$ and $\sum b_n$ both converges or both diverges $L = 0$: $\sum b_n$ converges $\implies \sum a_n$ converges $L = \infty$: $\sum b_n$ diverges $\implies \sum a_n$ diverges	11
Alternating Series Test	$\sum (-1)^{n-1} b_n$ where $b_n > 0$	$\{b_n\}$ decreasing and converging to 0 $\implies \sum (-1)^{n-1} b_n$ convergent	11
Absolute convergence	All series	absolutely convergent $\implies$ convergent	11
Ratio Test	All series with $\lim_{n\to\infty} \left\lvert \frac{a_{n+1}}{a_n} \right\rvert = L$	$L < 1$: absolutely convergent $L > 1$ or $L = \infty$: divergent	11
Root Test	All series with $\lim_{n\to\infty} \sqrt[n]{\lvert a_n\rvert} = L$	$L < 1$: absolutely convergent $L > 1$ or $L = \infty$: divergent	11