Let $\sum a_n = \sum_{n_0}^{\infty} a_n$; $\quad n_0 \in \mathbb{W}$; $\quad c, d, e, f \in \mathbb{R}$.

Name	**Form**	**Conditions**	**Conclusion(s)**
Test for Divergence			**If** $\lim_{n\to\infty} a_n \neq 0$, then $\sum a_n$ **diverges**. **If** $\lim_{n\to\infty} a_n = 0$, the test is **inconclusive**.
Harmonic Series Test	$\sum \frac{c}{dn+e}$		$\sum a_n$ **diverges**.
Geometric Series Test	$\sum a_0 r^n$		**If** $\mid r \mid < 1$, then $\sum a_n$ **converges** **&** $S = \frac{a_0}{1-r}$. **If** $\mid r \mid \geq 1$, then $\sum a_n$ **diverges**.
Telescoping Series Test	$\sum \frac{f}{cn^2+dn+e}$	Use partial fractions. Compute several terms and cancel.	$\sum a_n$ **converges** to sum of the remaining terms.
p-Series Test	$\sum \frac{1}{n^p}$		$\sum a_n$ **converges if** $p > 1$ and **diverges if** $p \leq 1$.
Integral Test		Let $a_n = f(n)$. Need to know how to evaluate $\int f(n)\,dn$. $f(n)$ **must be** continuous, positive, **&** decreasing on $[n_0, \infty)$.	**If** $\int_{n_0}^{\infty} f(n)\,dn$ converges, then $\sum a_n$ **converges**. **If** $\int_{n_0}^{\infty} f(n)\,dn$ diverges, then $\sum a_n$ **diverges**.
Comparison Test		Need to identify: $\sum b_n$ **&** whether $\sum b_n$ converges/diverges; Conditions: $a_n > 0$ for all $n > n_0$, **&** $b_n > 0$ for all $n > n_0$.	$\sum a_n$ **converges if** $\sum b_n$ converges **&** $a_n \leq b_n$ for $n > n_0$; $\sum a_n$ **diverges if** $\sum b_n$ diverges **&** $a_n \geq b_n$ for $n > n_0$.
Limit Comparison Test			$\sum a_n$ **converges if** $\sum b_n$ converges **&** $\lim_{n\to\infty} \frac{a_n}{b_n} \in \mathbb{R}^+$; $\sum a_n$ **diverges if** $\sum b_n$ diverges **&** $\lim_{n\to\infty} \frac{a_n}{b_n} \in \mathbb{R}^+$.
Alternating Series Test	$\sum (-1)^n a_n$	$\lim_{n\to\infty} a_n = 0$ **&** a_n is decreasing for all $n > n_0$.	$\sum a_n$ **converges**.
Absolute Convergence			**If** $\sum \mid a_n \mid$ converges, then $\sum a_n$ **converges**.
Conditional Convergence			$\sum a_n$ **converges conditionally** **if** $\sum a_n$ converges, **but** $\sum \mid a_n \mid$ diverges.
Root Test			**If** $\lim_{n\to\infty} \sqrt[n]{\mid a_n \mid} < 1$, then $\sum a_n$ **converges**. **If** $\lim_{n\to\infty} \sqrt[n]{\mid a_n \mid} > 1$, then $\sum a_n$ **diverges**. **If** $\lim_{n\to\infty} \sqrt[n]{\mid a_n \mid} = 1$, then test is **inconclusive**.
Ratio Test			**If** $\lim_{n\to\infty} \left\mid \frac{a_{n+1}}{a_n} \right\mid < 1$, then $\sum a_n$ **converges**. **If** $\lim_{n\to\infty} \left\mid \frac{a_{n+1}}{a_n} \right\mid > 1$, then $\sum a_n$ **diverges**. **If** $\lim_{n\to\infty} \left\mid \frac{a_{n+1}}{a_n} \right\mid = 1$, then test is **inconclusive**.