5. <u>Root Test.</u> <u>If</u> $\lim_{n\to\infty} \sqrt[n]{|a_n|} = r$ exists, then the same conclusions as in the Ratio Test apply:

$0 \le r < 1$ implies convergence of $\sum_1^\infty a_n$

$r > 1$ implies divergence of $\sum_1^\infty a_n$

$r = 1$ is inconclusive.

(The root and ratio tests are really comparison tests with a Geometric Series $\sum_1^\infty r^n$. If $r = 1$, then it is best to try the Integral Test or a comparison test with a p-series $\sum_{n=1}^\infty \frac{1}{n^p}$.)

6. <u>Alternating Series Test</u>. For series of the form $\sum_1^\infty (-1)^n b_n$.

<u>If</u> $b_n \ge 0$ for all n, if $\{b_n\}$ is decreasing, and if $\lim_{n\to\infty} b_n = 0$, then $\sum_1^\infty (-1)^n b_n$ converges.

This also applies to $\sum_1^\infty (-1)^{n-1} b_n$