Section 11.7 - Strategy for Testing Series

A summary of what we have learned so far:

(i) If the series is of the form $\sum 1/n^p$, it is a p-series which we know is convergent if $p > 1$ and divergent if $p \leq 1$.

(ii) If the series has the form $\sum ar^{n-1}$ or $\sum ar^n$, it is a geometric series which converges if $|r| < 1$ and diverges if $|r| \leq 1$.

(iii) If the series has a form that is similar to a p-series or geometric series, then one of the comparison tests can be used. If a_n is a rational/algebraic function of n then series should be compared to a p-series. Value of $p =$highest powers of n in the numerator and denominator. Comparison tests only apply to positive terms. If there are negative terms then we apply the Comparison test to $\sum |a_n|$ and test for absolute convergence.

(iv) If you see that $\lim_{n \to \infty} a_n \neq 0$ then the series is divergent.

(v) If the series is of the form $\sum(-1)^{n-1}b_n$ or $\sum(-1)^n b_n$ then use the alternating series test.

(vi) Series that involve factorials or other products (including a constant raised to the nth power) are often tested using Ratio test.

(vii) If a_n is of the form $(b_n)^n$ then root test should be useful.

(viii) If $a_n = f(n)$ where $\int_1^{\infty} f(x)dx$ is easily evaluated then the Integral test should be considered.

Just practice as many questions as you can since this section uses all the techniques we have learned thus far.