MATH 1953 Exam 3 Topics List/Study Guide

Here is a list of topics that can appear on Exam 3.

• 11.2: Know how to find the exact sum of a convergent telescoping series.

• 11.3: Know how to use the Integral Test to check whether a series is convergent or divergent. Remember that you are only allowed to use the Integral Test if the terms x_n of your series are (i) decreasing and (ii) positive.

• 11.3: Know that if a convergent series $\sum_{n=1}^{\infty} x_n$ satisfies the conditions (i) and (ii) above, then you can estimate its sum to within any desired amount by using the formula $\sum_{n=N+1}^{\infty} x_n \leq \int_N^{\infty} x_n \, dx$.

• 11.4: Know how to use the Comparison and Limit Comparison Tests to check whether a series is convergent or divergent. Remember that you are only allowed to use these tests if the terms x_n of your series are positive. Know that your main candidates for comparison series are ones where you immediately know convergence/divergence already: geometric series (which converge if $-1 < r < 1$ and diverge otherwise) and p-series (which converge if $p > 1$ and diverge otherwise)

• 11.5: Know how to use the Alternating Series Test to check whether a series is convergent or divergent. Remember that you are only allowed to use the Alternating Series Test if your series can be written as $\sum_{n=1}^{\infty}(-1)^n x_n$ or $\sum_{n=1}^{\infty}(-1)^{n+1} x_n$ where x_n (i) is decreasing, (ii) is positive, and (iii) approaches 0.

• 11.5: Know that you can estimate the sum of an alternating series to within any desired amount by using the formula $\sum_{n=N+1}^{\infty} (-1)^n x_n \leq |x_{N+1}|$.