MATH 1953 Exam 2 Topics List/Study Guide

Here is a list of topics that can appear on Exam 2.

• 7.8: Know what an improper integral represents (both types), know how to evaluate them, know meaning of terms "converge" and "diverge." Know how to use the Comparison Test to either show that an improper integral of a positive function converges (by showing that it is less than a function whose integral converges) or diverges (by showing that it is greater than a function whose integral diverges.)

• 11.1: Know how to check whether a sequence converges or diverges using either L'Hospital's Rule (by representing the sequence as a function of x), simplification (and the fact that $\frac{1}{n} \to 0$), or the Squeeze Theorem (by trapping the sequence between two sequences converging to the same value).

• 11.1: Know how to check whether a sequence is increasing or decreasing (or neither) by either comparing terms (i.e. verifying the inequality $x_n \leq x_{n+1}$ or $x_n \geq x_{n+1}$) or calculus (by representing the sequence as a function of x and checking the sign of the derivative).

• 11.1: Know how to check that a sequence is bounded from above or bounded from below by either directly checking a simple inequality (e.g. $n^2 \geq 0$ or $-1 \leq \sin n \leq 1$) or using the fact that a convergent sequence is automatically bounded from both above and below.

• 11.2: Know what the partial sums of an infinite series are, and know that an infinite series converges/diverges if its sequence of partial sums converges/diverges. Know how to find the exact sum of geometric series using the formula $1 + r + r^2 + r^3 + \ldots = \frac{1}{1-r}$ for r in $(-1, 1)$ (and the fact that this series diverges if r is not in $(-1, 1)$.)