# MATH 2283 ADDITIONAL SAMPLE PROBLEMS

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The final exam will cover the Sections 1.1 - 1.4, 2.1 - 2.2, 3.1 - 3.7, 4.1 - 4.12. In addition to the problems given below, please also study the previous exam/sample questions/homework problems for the final exam.

1. Find the interval of convergence of the power series $\sum_{n=1}^{\infty}(-1)^n \dfrac{x^n}{(1+\sqrt{n})3^n}$

2. Determine whether the given series converges absolutely, converges conditionally, or diverges. Show your reasoning.

   a) $\sum_{n=1}^{\infty}(-1)^n \dfrac{2^n n!}{n^n}$

   b) $\sum_{n=1}^{\infty}(-1)^n \sin^2(1/n)$

   c) $\sum_{n=1}^{\infty}(-1)^n \dfrac{1}{n(\ln(n))^2}$

3. Expand $f(x) = \sqrt[4]{1-6x}$ as a binomial series and simplify.

4. Prove the following Theorem: (Alternating Series Test) Suppose that $\{a_n\}$ is a decreasing sequence of positive real numbers, and $\lim a_n = 0$. Then the alternating series $\sum_{n=1}^{\infty}(-1)^{n+1}a_n$ converges.