MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 6 **MATH 2000** FALL 2018

Due: Wednesday, October 31st, 2018 by 2:00pm. SHOW ALL WORK.

> **Note:** You should complete the worksheets for Sections 1.4 and 1.5 before you work on this assignment. There is no multivariable calculus material on this assignment.

1. Use the Integral Test to determine whether each of the following series is convergent or divergent.

   (a) $\displaystyle\sum_{i=1}^{\infty} \frac{1}{i(i^2+1)}$

   (b) $\displaystyle\sum_{i=1}^{\infty} \frac{2i^2+1}{i(i^2+1)}$

   (c) $\displaystyle\sum_{i=2}^{\infty} \frac{\ln(i)}{i^2}$

2. Suppose the 100th partial sum is used to approximate $\displaystyle\sum_{i=1}^{\infty} \frac{1}{\sqrt{i}e^{\sqrt{i}}}$. Show that the conditions of the remainder estimate for the Integral Test apply to this series, and use it to determine the bound on the accuracy of this approximation. (Express your answer to the first non-zero digit after the decimal. You do <u>not</u> have to compute the approximation itself.)

3. Use an appropriate Comparison Test to determine whether each of the following series converges or diverges.

   (a) $\displaystyle\sum_{i=1}^{\infty} \frac{1}{i(i^2+1)}$

   (b) $\displaystyle\sum_{i=1}^{\infty} \frac{2i^2+1}{i(i^2+1)}$

   (c) $\displaystyle\sum_{i=1}^{\infty} \frac{1}{i!}$

   (d) $\displaystyle\sum_{i=3}^{\infty} \frac{2^{i-1}(4i^2-5)}{6^{i+1}(2i-i^2)}$