University of Lethbridge
Department of Mathematics and Computer Science
MATH 2565 - Tutorial #8
Thursday, March 8

First Name:____

Last Name:____

There's already plenty of practice on the following pages, but if you want more, you can always go to the textbook.

1. Use the ratio or root test to determine whether the series is convergent or divergent. (If the test is inconclusive, or impractical, determine converge with another test.)

   (a) $\displaystyle\sum_{n=1}^{\infty} n\left(\frac{3}{5}\right)^{n}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^2}$

   (c) $\displaystyle\sum_{n=2}^{\infty} \left(\frac{1}{n}-\frac{1}{n^2}\right)^{n}$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{5^n+n^4}{7^n+n^2}$

   (e) $\displaystyle\sum_{n=1}^{\infty} \left(1+\frac{1}{n}\right)^{n^2}$

2. Determine if the series converges conditionally, or absolutely, or not at all:

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{\sin(n\pi/3)}{1+n\sqrt{n}}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

   (c) $\displaystyle\sum_{n=1}^{\infty} n\cos(\pi n)\sin(1/n)$

3. One can show that $\pi = \displaystyle\sum_{n=0}^{\infty} \frac{4(-1)^n}{2n+1}$. What is the least value of N such that the partial sum $S_N = \displaystyle\sum_{n=1}^{N} \frac{4(-1)^n}{2n+1}$ approximates the value of π, correct to 3 decimal places.

4. For each series below, indicate whether it converges or diverges. Also indicate which convergence test you used, and why.

   (a) $\sum_{n=1}^{\infty} me^{-m}$

   (b) $\sum_{n=1} \infty \frac{2(n^2+2)^{2018}}{3(n^3+n+3)^{2018}}$

   (c) $\sum_{k=1}^{\infty} \frac{(k!)^k}{k^{4k}}$