MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 7 **MATH 2000** FALL 2018

Due: Friday, November 23rd, 2018 by 2:00pm. SHOW ALL WORK.

> **Note:** You should complete the worksheets for Sections 1.6, 1.7 and 2.6 before you work on this assignment.

1. Use an appropriate test (or combination of tests) to determine whether each of the following series is absolutely convergent, conditionally convergent, or divergent.

   (a) $\displaystyle\sum_{i=1}^{\infty}(-1)^i\frac{2i+1}{3i^3-2}$

   (b) $\displaystyle\sum_{i=1}^{\infty}(-1)^i\frac{2i^2+i}{3i^3-2}$

   (c) $\displaystyle\sum_{i=1}^{\infty}(-1)^i\frac{2i^3+i}{3i^3-2}$

   (d) $\displaystyle\sum_{i=0}^{\infty}\frac{7^i}{1\cdot 3\cdot 5\cdots(2i+1)}$

   (e) $\displaystyle\sum_{i=1}^{\infty}(-1)^{i+1}\frac{(3i)!}{(i!)^3}$

   (f) $\displaystyle\sum_{i=1}^{\infty}\frac{i}{[\arctan(i)]^i}$

2. Determine the number of terms which would be required to approximate $\displaystyle\sum_{i=1}^{\infty}\frac{(-1)^{i+1}}{4i^3}$ to an accuracy of at least 0.001. Compute this approximation.

---

3. Given $f(x,y)=xy\cos(x^2y)$, compute each of the following partial integrals.

   (a) $\displaystyle\int f(x,y)\,dx$

   (b) $\displaystyle\int f(x,y)\,dy$

PLEASE TURN OVER

4. The equation

$$4x - y + 2z = 8$$

represents a plane. (Those of you who have completed MATH 2050 should recognise it as a plane with normal vector $\begin{bmatrix} 4 \\ -1 \\ 2 \end{bmatrix}$. Everyone else can ignore this comment.) Use a double integral to find the volume of the solid which lies under this plane and above the rectangle $R : [-2, 2] \times [0, 5]$.

5. The graph of the function

$$f(x, y) = 9 - x^2 + y^2$$

is a *hyperbolic paraboloid*, as shown below. Compute the volume of the solid which lies under this surface and above the square $R : [0, 3] \times [-1, 2]$.