MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 4 **MATH 2000** FALL 2018

Due: Wednesday, October 17th, 2018 by 2:00pm. SHOW ALL WORK.

> **Note:** You should complete the worksheets for Sections 1.3 (questions 1 to 4) and 2.4 before you work on this assignment.

1. Determine whether each of the following series is convergent or divergent by either finding a formula for its nth partial sum or using the Divergence Test. If the series is convergent, find its sum.

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

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

   (c) $\displaystyle\sum_{i=1}^{\infty} \sqrt[i]{i}$

   (d) $\displaystyle\sum_{i=1}^{\infty} \ln\left(\frac{2i - 1}{3i + 1}\right)$

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

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2. Use the Chain Rule to find $\dfrac{dz}{dt}$, given $z = \sin(x)\cos(y)$, $x = \ln(t)$, $y = \sqrt{t}$.

3. Use the Chain Rule to find f_x, f_y and f_z, given $f(\alpha, \beta) = \sqrt{\alpha^2 - \beta^2}$, $\alpha = x\tan(y)$, $\beta = \dfrac{x^3}{y + 3z}$.

4. Differentiate implicitly to find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$, given

$$x^2 y + y^3 z^2 - z^4 x^3 = x e^y \cosh(z).$$