MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 8 **MATH 2000** FALL 2018

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

Assignment 8 must be submitted separately from (ie, not stapled or otherwise attached to) Assignment 7.

> **Note:** You should complete the worksheets for Sections 1.8 and 2.7 before you work on this assignment.

1. Find the radius of convergence and the interval of convergence for each of the following power series.

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

   (b) $\displaystyle\sum_{i=0}^{\infty} \frac{(-1)^{i+1}}{6^i \ln(i)}(3-2x)^i$

   (c) $\displaystyle\sum_{i=0}^{\infty} (-1)^i \frac{i^4}{8^{2i-1}} x^{3i}$

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2. Let D be the region in the xy-plane bounded by the parabola $y = \frac{1}{16}x^2$ and the semi-parabola $y = \frac{1}{2}\sqrt{x}$. Find the volume of the solid which lies above D and under the surface $z = xy^2$ in two ways.

   (a) By treating D as a Type I region (bounded by functions of x).

   (b) By treating D as a Type II region (bounded by functions of y).

3. Use a double integral to find the area of the triangular region with vertices $(-1, 4)$, $(1, 2)$ and $(2, 4)$.

4. Evaluate $\displaystyle\iint_D e^{2x^3}\, dA$ where D is the region bounded by the parabola $y = x^2$, the line $x = 1$ and the x-axis.

5. Reverse the order of integration and evaluate the integral $\displaystyle\int_0^{\sqrt[6]{\pi}} \int_{x^3}^{\sqrt{\pi}} x^2 \sin(y^2)\, dy\, dx$.