

McGill University
Math 262: Intermediate Calculus
Written Assignment 1

All Questions are of equal value

This assignment is to be returned to your instructor
by the beginning of class on Wednesday October 19

Make sure your name and your instructors name
are at the top of your assignment

1. Given the series

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-5)^{2n}}{n \cdot 3^n}$$

- (a) Find those values of x for which the series converges absolutely, converges conditionally, diverges.
- (b) How many terms of the series are enough to approximate the sum of the series for $x = 5.1$ with an error of less than 10^{-8} . (**Hint: Use the alternating series error estimation.**)

2. (a) Using series, find

$$\lim_{x \rightarrow 0} \frac{\cos(2x^2) - 1}{\ln(1 - x^4)}.$$

- (b) Using series, find the 8-th derivative of

$$f(x) = \frac{\tan^{-1}(2(x-1)^2)}{(x-1)^2}$$

at $x = 1$.

3. Find the series solution $y = \sum a_n x^n$ of the differential equation

$$y'' + xy' + 2y = 0$$

with $y(0) = 1$, $y'(0) = 0$. What is the radius of convergence of this series?