Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih Math 102- Q6 Date: 23-1-2010

Show all your work. No credits for answers not supported by work

1. Find the power series representation of $\frac{1}{1+x}$

2. Use (1) above to find the Maclaurin series representation of $\frac{t}{1+t^2}$

3. Find the Maclaurin series representation of $\ln(1+x^2)$.

   Note: you may use $\int_0^x \frac{t}{1+t^2}\,dt$.

4. What is the radius of convergence of the power series in (4)

5. Use (4) to find the sum of the alternating **harmonic series** $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n}$

6. Find the Taylor series of $\frac{1}{1+x}$ centered at $c = 2$ (i. e. in powers of (x-2))