

Math 1220, Problem Set #9

Name:

Due: Monday, April 18th. *Show all work for partial credit!*

1. Find the interval of convergence of the power series $x + 2x^2 + 3x^3 + 4x^4 + \dots$

2. Find the interval of convergence of the series $1 + \frac{x+2}{4} + \frac{(x+2)^2}{4^2} + \frac{(x+2)^3}{4^3} + \dots$

3. Using known Maclaurin series, find a power series for each of the following functions.

(a) $x \cdot \sin(x^3)$

(b) $e^x + e^{-x}$

4. None of our integration techniques help in finding $\int_0^1 \cos(\sqrt{x}) dx$. Approximate $\cos(\sqrt{x})$ using the first 4 nonzero terms of its Maclaurin series, then integrate this Maclaurin polynomial term by term to estimate the area $\int_0^1 \cos(\sqrt{x}) dx$.

5. Define the area function $A(x) = \int_0^x \frac{\sin t}{t} dt$. Integrate the series for $\frac{\sin t}{t}$ term by term and then evaluate the limits to find the Maclaurin series for $A(x)$.