

Written Homework 11

Math 126

Solve each of the following problems. Write your solutions clearly and neatly on separate paper, explaining your reasoning with complete sentences. Submit your work either in class or in the homework mailbox (RMS level 3, near the fireplace) by 4:00pm on **Monday, October 28**.

- Find the Maclaurin series for $f(x) = 4x^2 + 7x - 5$.
 - Find the Maclaurin series for $f(x) = x^3 - 2x^2 + 4x + 1$.
 - Based on your observations in parts (a) and (b), make a conjecture about the Maclaurin series for f when f is a polynomial.
- The limit $\lim_{x \rightarrow 0} \frac{\sin(x)}{x}$ is tough to evaluate, but series can help! Replace $\sin(x)$ by the first few terms of its Maclaurin series. Now you can see that the limit equals what number?
- Use the first three terms of the Maclaurin series for e^x to estimate e^1 . Then use a calculator to find how much your estimate differs from the exact value of e .
 - How many terms of the Maclaurin series for e^x do you need to estimate the value of e^1 with an error of less than 0.001?