

## Math 121 Assignment 10

Due Wednesday April 14

### ■ Practice problems:

- Try out as many problems from Sections 9.7–9.9 as you can, with special attention to the ones marked as challenging problems. As a test of your understanding of the material, work out the problems given in the chapter review. You may skip the ones that require computer aid.

### ■ Problems to turn in:

1. Find the Maclaurin series for the functions:

(a)

$$L(x) = \int_1^{1+x} \frac{\ln t}{t-1} dt$$

(b)

$$M(x) = \int_0^x \frac{\tan^{-1} t^2}{t^2} dt$$

2. Evaluate the limits

(a)

$$\lim_{x \rightarrow 0} \frac{(e^x - 1 - x)^2}{x^2 - \ln(1 + x^2)}$$

(b)

$$\lim_{x \rightarrow 0} \frac{\sin(\sin x) - x}{x(\cos(\sin x) - 1)}$$

3. Find the Fourier series of the 3-periodic function

$$f(x) = \begin{cases} t & \text{if } 0 \leq t < 1 \\ 1 & \text{if } 1 \leq t < 2 \\ 3 - t & \text{if } 2 \leq t < 3. \end{cases}$$

4. Prove that the binomial coefficients satisfy:

$$\binom{n}{k-1} + \binom{n}{k} = \binom{n+1}{k}.$$