

MA 182 GROUP WORK (8.7)

NAME \_\_\_\_\_

1. Find the Maclaurin series for  $f(x) = e^{3x}$  using the definition of a Maclaurin series. Assume that  $f$  has a power series expansion. Do not show that  $\lim_{n \rightarrow \infty} R_n(x) = 0$ . Find the associated radius of convergence.

2. Find the Taylor series for  $f(x)$  centered at the given value of  $a$ . Assume that  $f$  has a power series expansion. Do not show that  $\lim_{n \rightarrow \infty} R_n(x) = 0$ .  
 $f(x) = x^{-2}$ ,  $a = 1$

3. Use a Maclaurin series derived in this section to obtain the Maclaurin series for  $f(x) = \sin(x^4)$ .

4. Evaluate the indefinite integral as an infinite series  $\int \frac{e^x - 1}{x} dx$ .

Note:  $e^x - 1 = \sum_{n=0}^{\infty} \frac{x^n}{n!} - 1 = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots - 1 = \sum_{n=1}^{\infty} \frac{x^n}{n!}$

5. Find the sum of the series  $\sum_{n=1}^{\infty} \frac{(-1)^n}{n!}$ .