Math 101 – WORKSHEET 33
TAYLOR SERIES AND DERIVATIVES

The Taylor series of \( f(x) \) centered at \( a \) is

\[
\sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(x-a)^n
\]

(1) Find the MacLaurin series of \( f(x) = e^x \).

(2) (Final 2014) Find the Taylor series \( g(x) = \log x \) centered at \( a = 2 \), as well as its radius of convergence.

(3) (Final 2014) Let \( \sum_{n=0}^{\infty} c_n x^n \) be the MacLaurin series for \( e^{3x} \). Find \( c_5 \).

(4) (Final 2013) Let \( f(x) = x^2 \sin(x^3) \). Find \( f^{11}(0) \).