Math 101 – WORKSHEET 34
TAYLOR SERIES AND LIMITS

1. Derivatives

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

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

(3) Let $g(x) = \begin{cases} \frac{e^{-x^2}-1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$.

(a) Find $g^{(3)}(0)$.

(b) (2011 Final) Give the first three non-zero terms of the MacLaurin series for $\int g(x)\,\mathrm{d}x$.

Date: 4/4/2016, Worksheet by Lior Silberman. This instructional material is excluded from the terms of UBC Policy 81.

2. Limits without l'Hôpital's rule

(4) (Final 2012) Evaluate $\lim_{x\to 0} \frac{\sin(x)-x+x^3/6}{\sin(x^5)}$

(5) Evaluate $\lim_{x\to 0} \frac{x\sin x-\log(1+x^2)}{e^{-x^2/2}-\cos(x)}$