

**QUIZ 4 (SECTIONS 11.6-11.8)**

MATH 151 – SPRING 2004 – KUNIYUKI

**PART 1: GRADED OUT OF 80 POINTS; SCORE CUT IN HALF (80 → 40)****PART 2: 65 POINTS****TOTAL ON PARTS 1 AND 2: 105 POINTS, BUT 100 POINTS = 100%****(PART 1)****No notes, books, or calculators!**

Fill in the table below. You may use the back for [ungraded] scratch work.  
Simplify where appropriate, but you do not have to compute factorials.

$f(x)$	First four nonzero terms of the Maclaurin series	Summation notation form for the Maclaurin series	Interval of convergence, $I$ , for the Maclaurin series
$\sin x$			
$\cos x$			
$\sinh x$			
$\cosh x$			
$\tan^{-1} x$			
$e^x$			
$\ln(1+x)$			
$\frac{1}{1-x}$			

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1) Consider the series  $\sum_{n=1}^{\infty} \frac{5n}{3^n} (x+2)^n$ . (27 points total)

a) What is the center of this series?

b) Find the interval of convergence. Show all work, as in class!

**YOU MAY USE THE BACK OF THIS SHEET.**

2) Use summation notation to answer the following. (10 points total)

a) Find a power series representation for  $f(x) = \frac{1}{2+9x}$ ,  $|x| < \frac{2}{9}$ .

b) Use part a) to find a power series representation for  $D_x\left(\frac{1}{2+9x}\right)$ ,  $|x| < \frac{2}{9}$ .

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- 3) Evaluate  $\int x^3 \arctan x^5 dx, |x| < 1$ . Hint: The Maclaurin series for  $\arctan x$  is  $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1}$ . Just use series; don't use integration by parts. (12 points)

- 4) Find the first four terms of the Taylor series for  $f(x) = 4^x$  at  $c = 2$ .  
(Assume that such a series exists.) (16 points)

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