Math 175-004 **In Class Assignment 5** **Apr. 14, 2008**

Names:_____

1. Find the Taylor polynomial $P_N(x)$ for the given function f at the number $x = a$. Write an equation for the remainder of order N, i.e. $R_N(x)$.

   (a) $f(x) = x^3 + 3x^2 - 5$, $a = 0$, $n = 3$

   (b) $f(x) = e^x \sin x$, $a = 0$, $n = 3$.

(c) $f(x) = \ln x$, $a = 2$, $n = 5$.

2. Find a general formula for the Taylor series generated by f at $x = a$

(a) $f(x) = x^3 + 3x^2 - 5$, $a = 0$ (compare this to problem 1a).

(b) $f(x) = \cos x$, $a = \pi$.

(c) $f(x) = \dfrac{x}{1-x}$, $a = 0$ (compare this to the geometric series formula for $\dfrac{1}{1-x}$).

3. (a) Find the general formula for the Taylor series of $f(x) = \ln x$ for $a = 1$.

(b) Evaluate the series at $x = 2$ and simplify. Does this series look familar?

(c) Does the series from part (a) converge? If so, what does it converge to?