Math 2730 Assignment 4

Due March 26 in class

1. Find the power series with sum equal to $g(x) = \dfrac{x^2}{(1+2x)^2}$ and find the interval of convergence of the power series.

2. Show directly (using Taylor's inequality) that $\cos x = \sum\limits_{n=0}^{\infty} (-1)^n \dfrac{x^{2n}}{(2n)!}$.

3. Find the Maclaurin series representation for the following functions and identify the interval of convergence of the series.

(a) $\dfrac{e^{2x^2} - 1}{x^2}$

(b) $\sin x \cos x$ (Hint: start with $\sin 2x$)

(c) $\tan^{-1}(3x)$

4. Find the Taylor series representation of the function $\ln x$ centered at a=3.

5. Use multiplication of series to find the first three nonzero terms of the Maclaurin series representation of the function $\ln(2 + x) \cdot \tan^{-1}(x^2)$.

6. Use power series to evaluate $\int\limits_0^x \cos(t^2)dt$.