Calculus II
Practice Problems 9

In problems 1-5 find the radius of convergence of the series:

1. $\sum_{n=1}^{\infty} \frac{2^n}{(n+1)!}x^n$

2. $\sum_{n=1}^{\infty} \frac{n}{3^n}x^n$

3. $\sum_{n=0}^{\infty} n(n-1)(n-2)(\frac{x}{3})^n$

4. $\sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^2}x^n$

5. $\sum_{n=1}^{\infty} \frac{(n+1)(n+2)(n+3)}{n!}x^n$

6. Let $f(x) = \sum_{n=0}^{\infty} \frac{(n+2)(n+1)}{n!}x^n$. Find a formula for the function f.

7. Find the Taylor series centered at the origin for the $F(x) = \int_0^x \frac{dt}{1-t^4}$.

8. Find the Taylor series centered at the origin for the antiderivative (indefinite integral) of $f(x) = \frac{e^{-x^2}-1}{x}$.

9. Find the Taylor series centered at the origin for the function $\int_0^x \frac{1+t^2}{1-t^2}dt$.

10. Find the Taylor series centered at the origin for the function $\frac{1}{(1-x^2)^2}$.

11. Find the Taylor expansion of x^3 centered at the point -1.

12. Find the Taylor series centered at the origin for the function $\cosh x = \frac{e^x + e^{-x}}{2}$

13. Find the first 5 coefficients of the Maclaurin series for $f(x) = e^x \cos x$.

14. Expand $f(x) = 1 + x - 3x^2 + x^9$ in a Maclaurin series.